Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit Open	B269A	Controller specific output driver circuit diagnoses the Heater Coolant Pump Control Circuit 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 Ω impedance between signal and controller ground.	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers B269C may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit Low	B269C	Controller specific output driver circuit diagnoses the Heater Coolant Pump Control Circuit 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 Ω impedance between signal and controller ground	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers B269A may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit High	B269D	Controller specific output driver circuit diagnoses the Heater Coolant Pump Control Circuit 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 Ω impedance between signal and controller power.	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Door Open Switch Signal - Door Ajar Switch Signal Not Plausible	B2A00	Compares the Door Ajar and Door Open Switch for mismatch	Door Open Switch AND Door Ajar switch	=OPEN = CLOSED	Ignition Not Fault Active	= Run/Crank OR = Accessory U0422	240 failure out of 240 samples 12.5 ms loop	Special Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-10.0 Crank Degrees 10.0 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning No Active DTCs: Time since last execution of diagnostic	 CrankSensor_FA P0340, P0341 < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	Detects an Outside Air Temperature (OAT) sensor that is stuck in range. There are two components to the test: an engine off component, and an engine running component. If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled. If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move. For applications that have ability to move without engaging the internal combustion	**Engine Off:** 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	Time between current ignition cycle and the last time the engine was running Engine is not running Vehicle Speed Coolant Temperature - IAT IAT - Coolant Temperature OAT-to-IAT engine off equilibrium counter The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off** No Active DTCs:	 >= 28,800.0 seconds >= 12.4 MPH < 15.0 deg C < 15.0 deg C >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error	Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.	**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	Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine air flow 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 >= 12.4 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error	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 Illum.
		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						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 Illum.
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	<= 52 Ohms (~150 deg C)	Continuous		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 Illum.
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	>= 403,672 Ohms (~-60 deg C)	Continuous		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 Illum.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic signal in the Outside Air Temperature (OAT) circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”. Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings		Continuous	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 Illum.
Fuel Rail Pressure (FRP) Too Low	P0087	Determine if rail pressure is below an absolute value.	Rail pressure	< 0 to 10 MPa (see table **P0087 Minimum rail pressure**)	Run crank voltage Engine running, cranking excluded, for a time No IFT running (refer to FUL_IFT_St) No engine shut down request LowFuelConditionDiagnostic Fuel pressure estimated at high pressure pump inlet is valid Fuel pressure estimated at high pressure pump inlet No DTC active:	≥ 11.0 V >= 30.00 s = FALSE >= 360.00 kPa FuelPumpRlyCktFA P0091 P2294 P2296	320 failures out of 457 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Performance	P0089	Determine when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 67 to 217 MPa (see table **P0089 Maximum rail pressure with MU**)	Run crank voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*)	≥ 11.0 V	160 failures out of 229 samples OR 160 continuous failures out of 229 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit	P0090	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit: impedance between signal and controller ground	≥ 200 kΩ	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_MU_DrvrCloseTFTKO FHP_MU_DrvrOpenTFTKO	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit Low Voltage	P0091	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground: impedance between signal and controller ground	≤ 0.5 Ω	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_MU_DrvrCloseTFTKO FHP_MU_DrvrOpenTFTKO	44 failures out of 88 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 Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit High Voltage	P0092	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power: impedance between signal and controller power	≤ 0.5 Ω	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_MU_DrvrCloseTFTKO FHP_MU_DrvrOpenTFTKO	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 Low	P0097	Detects a continuous short to ground in the Intake Air Temperature 2 (IAT2) signal circuit or an IAT2 sensor that is outputting a frequency signal that is too low. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency 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 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 temperature value. A lower frequency is equivalent to a lower temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	< 10 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time 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 Illum.
Intake Air Temperature Sensor Circuit 2 High	P0098	Detects an Intake Air Temperature 2 (IAT2) sensor that is outputting a frequency signal that is too high. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency 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 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 temperature value. A higher frequency is equivalent to a higher temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	> 390 Hertz (~150 deg C)	Powertrain Relay Voltage for a time 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 Illum.
Intake Air Temperature Sensor 2 Intermittent In-Range	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 2 readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 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 Illum.
Multiple Pressure Sensor Correlation Performance (3 intake air pressure sensor configuration)	P00C7	This monitor is used to identify if BARO, MAP and TCIAP pressure values are irrational when compared to each other. The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If the three sensors are not in agreement the monitor is not able to pinpoint the sensor(s) that is/are not working correctly and therefore indicates that there is a fault that impacts the three sensors.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 20.00 [mm^3] > 90.00 [%] > 60.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 20.0 [kPa] <= 20.0 [kPa] <= 20.0 [kPa] <= 20.0 [kPa] > 20.0 [kPa] <= 20.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure TCIAP Pressure TCIAP Pressure No Active DTCs: No Pending DTCs:	> 5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor	<= 20.0 [kPa] > 20.0 [kPa] > 20.0 [kPa] > 20.0 [kPa] > 20.0 [kPa]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Circuit Performance	P00E9	Detects an Intake Air Temperature 3 (IAT3) sensor value that is stuck in range by comparing the IAT3 sensor value against the IAT and IAT2 sensor values and failing the diagnostic if the IAT3 value is more different than the IAT and IAT2 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT2 values are similar, and the IAT3 value is not similar to the IAT and IAT2 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT3 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**Good Correlation Between IAT and IAT2** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	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	Type A, 1 Trips
			Not Good Correlation, IAT in Middle Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	 > 25 deg C	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	
			Not Good Correlation, IAT2 in Middle Power Up IAT2 is between Power Up IAT and Power Up IAT3		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds	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 Illum.
		ignition cycle if the enable conditions are met.	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	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 Low	P00EA	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	< 83.59 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 High	P00EB	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	> 153,360 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 3 readings	Continuous		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 Illum.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to ground in the humidity signal circuit or a humidity sensor that is outputting a duty cycle that is too low. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time 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 Illum.
Humidity Sensor Circuit High	P00F5	Detects a humidity sensor that is outputting a duty cycle signal that is too high. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	>= 95.0 %	Powertrain Relay Voltage for a time 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 Illum.
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. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	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	Powertrain Relay Voltage for a time No Active DTCs:	>= 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 Illum.
Manifold Absolute Pressure (MAP) Sensor Performance (3 intake air pressure sensor configuration)	P0106	This monitor is used to identify MAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If MAP sensor is not in agreement with the other two the monitor is able to pinpoint MAP as the faulty sensor.	Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 20.00 [mm^3] > 90.00 [%] > 60.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			MAP sensor OR MAP sensor OR Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 20.0 [kPa] > 20.0 [kPa] <= 20.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low (with pull-up)	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.3 % of 5 Volt Range (This is equal to 7.5 kPa)	Continuous		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 Illum.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 421.5 kPa)	Continuous		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 Illum.
Intake Air Temperature Sensor Circuit Performance (applications with IAT, IAT2 and IAT3)	P0111	Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and IAT3 sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT2 and IAT3 values are similar, and the IAT value is not similar to the IAT2 and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**Good Correlation Between IAT2 and IAT3** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	 > 25 deg C > 25 deg C <= 25 deg C	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	Type B, 2 Trips
			Not Good Correlation, IAT2 in Middle 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	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	
			Not Good Correlation, IAT3 in Middle Power Up IAT3 is between Power Up IAT and Power Up IAT2		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds	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 Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Low	P0112	Detects a continuous short to ground in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too low. The IAT 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 Input	< 62.00 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	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 Illum.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too high. The IAT 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 Input	> 126,840 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	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 Illum.
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	Continuous		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 Illum.
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 (@ 150ºC)	< 55 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 (@ -60ºC)	> 134,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -9.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	ECT temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. The calculated high and low limits for the next reading use the following calibrations: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last ECT reading was 90 Deg C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 Deg C and the high limit was calibrated to 200 Deg C the caluculated limits are 101 Deg C and 73 Deg C. The next reading (after the 90 Deg C reading) must be between 73 Deg C and 101 Deg C to be valid. **********	 7.4 seconds -60.0 Deg C 200.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 19 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 65 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 50 °C when Ambient min is ≤ 10 °C and > -9 °C. Note: Warm up target for range #2 will be at least	See the two tables named: **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary** and **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate** in the Supporting tables section. This diagnostic models the net energy into and out of the cooling	No Active DTC's Engine not run time (soaking time before current trip) Engine run time Fuel Condition Distance traveled ********** If Engine RPM is continuously greater than for this time period The diagnostic test for this key cycle will abort ********** ********** If T-Stat Heater commanded duty cycle for this time period	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA EngineTorqueEstInaccurate ≥ 1,800 seconds 30 ≤ Eng Run Tme ≤ 1,475 seconds Ethanol ≤ 87 % ≥ 0.50 miles ********** 5,000 rpm 5.0 seconds ********** ********** > 20.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			55 °C ********** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 65 °C when Ambient min is ≤ 52 °C and > 10 °C. == == == == Range #2 (Alternate) ECT reaches 55 °C when Ambient min is ≤ 10 °C and > -9 °C. **********	system during the warm-up process. The five energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	The diagnostic test for this key cycle will abort ********** ECT at start run	********** -40 ≤ ECT ≤ 51 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Performance (FTS wired to FTZM)	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	Averaged for absolute difference between fuel temperature and reference temperature is and (see **P0181 Fuel Temperature Sensor Reference**)	< 20.00 °C >= 20.00 °C	Run crank voltage Run crank voltage FTZM Run crank voltage Engine not cranking A time and is passed since engine movement is detected Engine soak time No error for Engine Not Running timer (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "*OBD Coolant Enable Criteria*" section)) Sensor Bus Relay commanded on No DTC active: At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.0 > 8 s < 8.50 s > 28,799 s > -40 °C = TRUE FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	1 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 Illum.
Fuel Temperature Sensor A Circuit Low (FTS wired to FTZM)	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	< 50 Ω	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit High (FTS wired to FTZM)	P0183	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	> 121,865 Ω	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit Intermittent (FTS wired to FTZM)	P0184	Determine when fuel temperature sensor changes quicker than expected, likely due to an intermittent fault.	Fuel temperature	> (1 - α) * 156 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	< (1 - α) * -56 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 kPa	a) Diagnostic enabled [FDBR_b_FPSS_DiagEnbld] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] c1) Fuel Flow Rate Valid c2) FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTC P12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTC P129F] c8) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_Info1_UcodeCmFA DTC P165C] c9) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	a) == TRUE b) >= 5.00 seconds c1) == TRUE c2) <> TRUE c3) <> TRUE c4] <> TRUE c5) <> TRUE c6) <> TRUE c7) <> TRUE c8) <> TRUE c9] <> TRUE	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 Illum.
					c10) Fuel Pump Duty Cycle Fault Active	c10) <> TRUE		
					c11) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c11) == CeFDBR_e_WiredTo_FTZM		
					c12) Sensor Bus Relay On	c12) == TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == Normal Control OR == Fuel Pres Sensor Stuck Control		
					g) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]	g) >= 0.05 gm/sec		
					h) Diagnostic System Disabled [DRER_b_DiagSysDsb]	h) <> TRUE		
					j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr DTC]	j1) <> TRUE		
					j2) CAN Sensor Bus message $0C3_Available	j2) == TRUE		
					j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and	j3) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo ECM d2) IF NOT, then 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 enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig] d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3_Available d4) Fuel Pres Sensor Ref	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	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 Illum.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FTZM <> WiredTo FTZM, then see Case1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo ECM d2) IF NOT, then 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 enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig] d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3_Available d4) Fuel Pres Sensor Ref	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	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 Illum.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FTZM <> WiredTo FTZM, then see Case1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor A Performance	P0191	Determine when fuel rail pressure sensor is not plausible, due to offset or drift.	Rail pressure sensor output (as percentage of supply voltage) OR Rail pressure sensor output (as percentage of supply voltage)	> 14.0 % < 6.5 %	Engine off time No error for Engine Not Running timer No engine movement detected since begin of driving cycle (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "*OBD Coolant Enable Criteria*" section)) Run crank voltage Run crank voltage No active DTC:	≥ 35 s ≥ -40 °C = TRUE > 6.0 V ≥ 11.0 V ECT_Sensor_FA FHP_RPS_CktFA	42 failures out of 60 samples 6.25 ms/sample	Type A, 1 Trips
			Absolute difference between rail pressure #1 (first trace) and rail pressure #2 (second trace)	> 21.0 MPa	**P0191 Rail Pressure Sensor Configuration** Run crank voltage Run crank voltage No active DTC:	= CeFHPG_e_RPS_DoubleTrack > 6.0 V ≥ 11.0 V FHP_RPS_CktFA P0194	33 failures out of 55 samples 6.25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor A Circuit Low Voltage	P0192	Determine when a short circuit to ground affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.3 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 ≥ 15 s > 8.4 V	38 failures out of 76 samples OR 22 continuous failures out of 76 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor A Circuit High Voltage	P0193	Determine when a short circuit to voltage affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 94.8 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 ≥ 15 s > 8.4 V	38 failures out of 76 samples OR 22 continuous failures out of 76 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	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.	For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 0 (non - heated t-stat) == == == ==		No Active DTC's	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA	30 failures out of 60 samples 1 sample / second Continuous	Type B, 2 Trips
					Engine Runtime	≥ 0.0 seconds		
			Engine coolant temperature	≤ 64.0 Deg C	Distance traveled this key cycle	≥ 0.8 km		
			**********		Ambient air pressure	≥ 55.0 kPa		
			Type cal above = 1 (Electrically heated t-stat) == == == ==		Ambient air temperature	≥ -9.0 Deg C		
					**********			
			Engine coolant temperature	≤ 70.5 Deg C	Engine coolant temperature At least once during the key cycle			
					Type 0 (non-heated t-stat)	≥ 65 Deg C		
					Type 1 (Electrically heated T-stat)	≥ 71.5 to 86.5 Deg C		
					**********			
					Heat to coolant	≥ 1.0 kW		
					DFCO time	≤ 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Thermostat duty cycle RPM Active Fuel Management is not in	≤ 20.0 % ≤ 5,100 Half Cylinder Mode		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger "A" Overboost Condition	P0234	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent negative control deviation of the boost pressure indicating an overboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the overboost pressure monitor is to detect obstructions in the exhaust pipe. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to an obstruction) that leads to exceed the emission limits.	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) lower than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): (**P0234: Negative boost deviation threshold (throttle control active)** [kPa] x **P0234, P2263: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] x **P0234, P2263: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -9.00 [°C] AND < 80.00 [°C] > -5 [kPa/s] AND < 5 [kPa/s]	320 fail counters over 400 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed in range	> 1,750.00 [rpm] AND < 3,000.00 [rpm]		
					Desired intake Boost pressure in range	> **P0234: Minimum boost pressure for overboost monitor enabling** [kPa] AND **P0234: Maximum boost pressure for overboost <monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60 [°C] ==TRUE < 124 [°C]		
					Ambient Air Pressure in range	> 75 [kPa] AND < 120 [kPa]		
					Throttle Valve position	>= 90.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 90.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger "A" Underboost Condition	P0299	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent positive control deviation of the boost pressure indicating an underboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the underboost pressure monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to a leakage) that leads to exceed the emission	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) higher than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control active)** [kPa] x **P0299, P2263: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control not active)** [kPa] x **P0299, P2263: Underboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -9.00 [°C] AND < 80.00 [°C] > -5 [kPa/s] AND < 5 [kPa/s]	320.00 fail counters over 400.00 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		limits.			Engine speed in range	> 1,200.00 [rpm] AND < 2,200.00 [rpm]		
					Desired intake Boost pressure in range	> **P0299: Minimum boost pressure for underboost monitor enabling** [kPa] AND **P0299: Maximum boost pressure for underboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60 [°C] ==TRUE < 124 [°C]		
					Ambient Air Pressure in range	> 75 [kPa] AND < 120 [kPa]		
					Throttle Valve position	>= 90.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 90.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 51 > 65	Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor - Crankshaft Direction Incorrect	P034B	The Crankshaft Direction Incorrect test monitors the number of crankshaft reversals reported by a bi-directional crank sensor.	Number of crankshaft sensor reversals within a period of time	>= 3 <= 10.0 seconds	Engine Speed Engine Speed Engine Air Flow Engine Movement Detected No Active DTCs:	> 400 RPM < 2,000 RPM >= 3.0 grams/second CrankSensor_FA	Continuous Every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow insufficient	P0401	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the EGR flow monitor is to detect HP EGR obstructions (insufficient EGR flow). The EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, EGR cooler outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBD limits. In particular environmental conditions where the provided EGR flow amount is not enough to have a robust monitoring, the EGR flow intrusive test can be enabled. When the intrusive test is	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant x **P0401: Insufficient EGR flow barometric table B (sea level)** [mg]) + (MidBaro Constant x **P0401: Insufficient EGR flow barometric table B (mid level)** [mg]) + (LoBaro Constant x **P0401: Insufficient EGR flow barometric table B (low level)** [mg]) + (SeaBaro Constant x	Calibration on diagnostic enabling HP EGR control is in closed loop on air flow OR LP EGR (if present) control is in closed loop on air flow OR Diagnostic enabled by calibration when HP/LP EGR control is in closed loop on HP/LP EGR flow Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| for a minimum number of samples	**P0401, P0402: EGR flow monitor enabling** ==TRUE Refer to "Other AICR DSL flags" Free Form 1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0 [%] <= 10 [rpm] > 50 [counts]	350.00 fail counters over 435.00 sample counters sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		enabled, a dedicated flow setpoint value is provided to air control.		**P0401: Insufficient EGR flow barometric table A (sea level)** [mg] x **P0401: Insufficient EGR flow barometric correction (sea level)**) + (MidBaro Constant x **P0401: Insufficient EGR flow barometric table A (mid level)** [mg] x **P0401: Insufficient EGR flow barometric correction (mid level)**) + (LoBaro Constant x **P0401: Insufficient EGR flow barometric table A (low level)** [mg] x **P0401: Insufficient EGR flow barometric correction (low level)**)	Fuel request is steady state: |FUEL-FUEL_old| for a minimum number of samples An air control transition has ended OR Such condition is disabled by calibration No active transition from a combustion mode to another one Throttle measured position Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Desired EGR flow	<= 0.65 [mm^3] > 175 [counts] Refer to "Air Control Transition"Free Form OR 1.00 ==TRUE ==TRUE > 90.00 [%] > -9.00 [°C] > 74.80 [kPa] > 60.00 [°C] ==TRUE > **P0401: Minimum desired EGR flow** [mg]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Desired fuel quantity	> **P0401: Insufficient EGR flow Min fuel enabling condition** [mm^3] AND < **P0401: Insufficient EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402: Outside air temperature" Free Form		
					No faults on proper temperature sensor	AIC_EGR_FlowDiagAirTempFA ==FALSE		
					All enabling conditions last for a time	> 0.60 [s]		
			Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant x **P0401: Insufficient EGR flow barometric table B (sea level)** [mg]) + (	Calibration on diagnostic enabling	**P0401, P0402: EGR intrusive test enabling** ==TRUE	350.00 fail counters over 435.00 sample counters	
					Difficult launch NOT detected	Refer to "LDT_DifficultLaunchActive" Free Form	sampling time is 25 ms	
					HP EGR control is in closed loop on air flow OR LP EGR (if present)	Refer to "Other AICR DSL flags" Free Form		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				MidBaro Constant x **P0401: Insufficient EGR flow barometric table B (mid level)** [mg]) + (LoBaro Constant x **P0401: Insufficient EGR flow barometric table B (low level)** [mg]) + (SeaBaro Constant x **P0401: Insufficient EGR flow barometric table A (sea level)** [mg] x **P0401: Insufficient EGR flow barometric correction (sea level)**) + (MidBaro Constant x	control is in closed loop on air flow OR Diagnostic enabled by calibration when HP/LP EGR control is in closed loop on HP/LP EGR flow Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| for a minimum number of samples Fuel request is steady state: |FUEL-FUEL_old| for a minimum number of samples An air control transition	1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0 [%] <= 10 [rpm] > 50 [counts] <= 0.65 [mm^3] > 175 [counts] Refer to "Air Control		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P0401: Insufficient EGR flow barometric table A (mid level) [mg] x **P0401: Insufficient EGR flow barometric correction (mid level)**) + (LoBaro Constant x **P0401: Insufficient EGR flow barometric table A (low level)** [mg] x **P0401: Insufficient EGR flow barometric correction (low level)**)	has ended OR Such condition is disabled by calibration	Transition"Free Form OR 1.00 ==TRUE		
					No active transition from a combustion mode to another one	==TRUE		
					Throttle measured position	> 90.00 [%]		
					Outside Air Temperature	> -9.00 [°C]		
					Ambient Pressure	> 74.80 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 60.00 [°C] ==TRUE		
					Outside air temperature in range	Condition must be FALSE. Refer to "P0401, P0402: Outside air temperature" Free Form		
					No faults on proper temperature sensor	AIC_EGR_FlowDiagAirTempFA ==FALSE		
					No faults on crank sensor or on fuel injection system	CrankSensor_FA ==FALSE FUL_GenericInjSysFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE		
					Time since last EGR flow insufficient monitoring (standard test or intrusive test) test completion	> 99,999.00 [s]		
					Desired fuel quantity	> **P0401: Insufficient EGR intrusive test Min fuel enabling condition** [mm^3] AND < **P0401: Insufficient EGR intrusive test Max fuel enabling condition** [mm^3]		
					All enabling conditions above last for a time	> 99,999.00 [s]		
					All enabling conditions (included the above timer) last for a time	> 0.60 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Range/ Performance	P040B	Determines the EGR temperature Sensor 2 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Down Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **Down Stream Stk Temp Vrtn**	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 Sec P262B Active	Cumulative EGR Flow > 300.00 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Low	P040C	Diagnose the EGR Down Stream Temperature sensor circuit low if the feedback of the Down Stream temp sensor is below allowed operating range the sensor is faulted.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 404.47 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt High	P040D	Diagnose the EGR Down Stream Temperature sensor circuit high if the feedback of the Down Stream temp sensor is above allowed operating range the sensor is faulted	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 1,267.95 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Intermittent/ Erratic	P040E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta change > 25.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Range/ Performance	P041B	Determines the EGR temperature Sensor 1 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Up Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **UP Stream Stk Temp Vrtn**	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 Sec P262B Active	cumulative EGR Flow > 300.00 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Low	P041C	Diagnose the EGR Up Stream Temperature sensor circuit low by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is below the allowed operating range, the sensor is out of range low.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 164.24 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt High	P041D	Diagnose the EGR Up Stream Temperature sensor circuit high by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is above the allowed operating range, the sensor is out of range high.	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 859.21 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 25.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Warm Up Catalyst Efficiency Below Threshold Bank 1	P0421	The Catalyst (CC DOC) monitor only runs during DPF regeneration and compares the CC DOC released oxidation heat and the post-injected fuel quantity both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that post-injection is enabled during CC DOC monitor in order to produce enough exothermic heat across the Catalyst to evaluate the component conversion efficiency in a reliable way. EWMA Filtering functionality (including	Catalyst Aging Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Aging Index < Repass Threshold	Aging Index < **CatCrtdEffThrsh** [Curve] If EWMA Enbl Cal = 1.00 [Boolean] AND Catalyst FA = CAT_CatSysEffLoB1_FA Then: Aging Index < **CatCrtdEffRepEWMA** [Curve]	- Catalyst monitor in DPF regeneration enabled by calibrations AND No active DTCs: - Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND - Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; **Catalyst monitor status is DISABLED if:** - DPF regeneration disabled OR - Injection system in fault (Fault Flag = TRUE) OR - Ambient temperature	RegenMonitorEnabled = 0.00 [Boolean] AND DPF_RegenMonitorSelected = NOT(1.00 [Boolean]) AND ReportingEnabled= 1.00 [Boolean] AND Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt); Samples nr. = 10.00 [Counter]; **Catalyst monitor status is DISABLED if:** DPF_DPF_St = SootLoading [Enumerative] OR Injection System Flt = FUL_GenericInjSysFlt OR Amb Temp FA = CAT_OutsideTempFA	Task Time = 100 [ms] If - Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean])	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Catalyst (CC DOC) monitor.			information in fault (Fault Active = TRUE) OR - Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE) OR - Ambient conditions not always satisfied while engine running: Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; **Catalyst monitor status can move from DISABLED to TRIGGERED if:** - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault	OR Cat Up Exh Flow Flt = EXF_TotExhCatUpFlt OR - Ambient conditions not always satisfied while engine running: Amb Press < 72.80 [KPa] OR Amb Temp < 264.00 [K] OR Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean]; **Catalyst monitor status can move from DISABLED to TRIGGERED if:** DPF_DPF_St ≠ SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA)	AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 1 trip (with no mulfunction) to report pass - 2.00 [Counter]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Catalyst up exhaust temperature (by sensor) lower than calibration AND HC unloading disabled; **Catalyst monitor status can move from TRIGGERED to**	AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 74.80 [KPa] AND Amb Temp > 266.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 110.00 [°C] AND Cat Up Temp Snsr < 1,073.00 [K]; AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean]; **Catalyst monitor status can move from TRIGGERED to**	elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Catalyst up exhaust temperature (by sensor) higher than calibration AND - Post injection enabled	**ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) if:** DPF_DPF_St ≠ SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND - Ambient conditions always satisfied while engine running: Amb Press > 74.80 [KPa] AND Amb Temp > 266.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat Up Temp Snsr > 373.00 [K] AND FUL_PostEnbl = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND - Catalyst up exhaust flow estimation in range AND - Catalyst up exhaust temperature (by sensor) in range AND - Post injection fuel rate in range AND - Consecutive time in which Post Injection Fuel rate is lower than a threshold is less than a calibration AND HC unloading disabled; **Oxidation heat release integrator and post injected fuel integrator are both frozen if:** - Engine not running OR - Catalyst up exhaust flow estimation out of range OR - Catalyst up exhaust temperature (by sensor) out of range OR - Post injection fuel rate	[Boolean] AND 0.00 < Cat Up Exh Flow < 170.00 [g/s] AND 400.00 < Cat Up Temp Snsr [K] < 850.00 AND 0.05 < Post Inj Fuel Qnty [g/s] < 2.00 AND Post Inj Fuel Qnty [g/s] < 0.00 for less than 0.00 [s] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean]; **Oxidation heat release integrator and post injected fuel integrator are both frozen if:** - Engine not running OR Cat Up Exh Flow [g/s] < 0.00 OR Cat Up Exh Flow > 170.00 [g/s] OR Cat Up Temp Snsr [K] < 400.00 OR Cat Up Temp Snsr [K] > 850.00 OR Post Inj Fuel Qnty [g/s] < 0.05		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					out of range OR - Consecutive time in which Post Injection Fuel rate is lower than a threshold is more than a calibration **Catalyst monitor status can move from ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if:** - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault	OR Post Inj Fuel Qnty [g/s] > 2.00 OR Post Inj Fuel Qnty [g/s] < 0.00 for more than 0.00 [s] **Catalyst monitor status can move from ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if:** DPF_DPF_St ≠ SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Integrated post injected fuel quantity higher than curve AND HC unloading disabled;	AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND - Ambient conditions always satisfied while engine running: Amb Press > 74.80 [KPa] AND Amb Temp > 266.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with dual fuel tanks 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 ********** 1a) If Deadband diagnostic subtest enabled 1b) If fuel volume in primary tank is 1c) and if fuel volume in secondary tank is 1d) and if 1b and 1c indications do not change while fuel volume consumed by engine is OR 2) ********** After Refuel Event ********** 2a) If primary tank volume change from Engine Off to next Engine On condition is 2b)then secondary tank volume change must be OR 3) ********** Fuel consumed without a Primary Fuel Level Change ********** 3a) If indicated fuel	 1a) == Disabled status 1b) ≥ 1,024.0 liters 1c) < 8.3 liters 1d) >= 19.9 liters 2a) >= 27.80 liters 2b) >= 3.00 liters	1a) Diagnostic Enabled 1b) Engine Operational State 2) Primary tank indicated volume @ shutdown plus 3.0 liters	1a) == True 1b) == Running 2) < 1,024.0 liters	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 Illum.
			volume change is 3b) while fuel consumed by the engine is	< 3 liters >= 16.8 liters				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a primary fuel tank sensor stuck out-of-range low.	Fuel level Sender % of 5V range	< 10 % or 28.20 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples 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 Illum.
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a primary fuel tank level sensor stuck out-of-range high.	Fuel level Sender % of 5V range	> 60 % or 3.94 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples 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 Illum.
Cooling Fan 1 Relay Control Circuit Open (ODM) (Not used on EREV)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0691 may also set (Fan 1 Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			Filter coefficient	0.00300	Coolant Temp	> -7 °C and < 124 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					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		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	 > 75.00 pct < 15.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed 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 Illum.
					All of the above met for Idle time	P2771 > 5 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
					Coolant Temp	> -7 °C and < 124 °C Must verify	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
			Filter coefficient	0.00300				
					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 or Clutch Pedal Position	> 75.00 pct < 15.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed 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	
					No active DTCs			
					All of the above met	> 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
Brake Assist Vacuum Too Low	P050F	Monitors for a brake booster vacuum leak	Brake booster vacuum drift ratio (EWMA) reaches the fail threshold (based on engine running condition) before the sample count threshold is reached, a failure is reported. Engine Running Fail Threshold based on prior diagnostic state (description below) Diagnostic failed prior loop Diagnostic passed prior loop Before the sample counts Engine Stopped Fail Threshold based on prior diagnostic state (description below) Diagnostic failed prior loop Diagnostic passed prior loop Before the sample counts	 >= 0.60 >= 0.65 > 0.00 counts >= 0.55 >= 0.65 > 0.00 counts	Diagnostic is enabled and the following conditions are met for engine run conditions: No brake booster vacuum sensor faults active No brake pedal position sensor faults active Brake pedal travel is No mass air flow faults No manifold air pressure faults Mass air flow estimate Manifold air pressure Engine vacuum stability time has reached Difference between brake booster vacuum and manifold air pressure is OR Diagnostic is enabled for the following engine auto off conditions:	Enabled < 8.00 percent - 5.00 percent offset >= 6.00 grams / second <= 20.00 kPa >= 0.70 seconds > 10.00 kPa Enabled	Performed every 100 msecond Minimum time to pass: Engine Running 0.00 second Engine Stopped 0.00 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No brake booster vacuum sensor faults active No brake pedal position sensor faults active Brake pedal travel is No engine movement detected Engine is in AutoStop mode OR Diagnostic is enabled for the following key off conditions: No brake booster vacuum sensor faults active No brake pedal position sensor faults active Brake pedal travel is No engine movement detected Engine is in KeyStop mode	< 8.00 percent - 5.00 percent offset Disabled < 8.00 percent - 5.00 percent offset		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Two Stage 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 runing test and engine off test. The engine running test compares the measured oil pressure to threshold. If the measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure against thresholds after the engine has stopped rotating. If the measured oil pressure is out of the thresholds, then the error counter increments.	**Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State** <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR	 Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_HiStatePressure** * 0.90 - 75.0 kPa) OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_HiStatePressure** ***** 1.80 + 75.0 kPa) Filtered Oil Pressure > **P0521_P06DD_P06DE_OP_HiStatePressu** (**re** * 0.90 - 75.0 kPa + 10.0 kPa) OR Filtered Oil Pressure < (	Two Stage Oil Pump is Present = TRUE Pump is in high pressure state 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 30.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature within range No active DTC's	TRUE Enabled Test not report a fail state Yes ≥ 10.0 seconds ≥ 70.0 kPa FALSE 1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	 ≥ 40 errors out of 50 samples. Performed every 100 msec ≥ 10 passes out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Engine Oil Pressure below high threshold minus an offset	**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.80 + 75.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: **P0521_P06DD_P06DE_OP_HiStatePressure**)				
			Two Stage Oil Pump EOP Sensor Test with Engine Running, Low Pressure State <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold	 Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_LoStatePressure** * 0.90 - 75.0 kPa) OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.10 + 75.0 kPa)	Two Stage Oil Pump is Present = TRUE Pump is in low pressure state 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 30.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature	TRUE Enabled Test not report a fail state Yes ≥ 10.0 seconds ≥ 70.0 kPa FALSE 1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C	 ≥ 40 errors out of 50 samples. Performed every 100 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			To pass when previously failing: 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_P06DD_P06DE_OP_LoStatePressure** * 0.90 - 75.0 kPa + 10.0 kPa) OR Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.10 + 75.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: **P0521_P06DD_P06DE_OP_LoStatePressure**)	within range No active DTC's	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	≥ 10 passes out of 50 samples. Performed every 100 msec	
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: To Fail when previously passing with the engine off: Filtered Engine Oil Pressure greater than threshold	Filtered Oil Pressure ≥ 40.0 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	TRUE Enabled Test not report a fail state ≥ 60.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA	≥ 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 Illum.
						EngOilPressureSensorCkt FA CrankSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> 400 rpm < 350 rpm Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit Low Voltage	P0532	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too low	(AC High Side Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 2 percent	AC HSP Sensor Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit High Voltage	P0533	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too high	(AC High Side Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 98 percent	AC HSP Sensor Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system.		Diagnostic enabled/ disabled	Enabled	Pass counter incremented when enable conditions are met, pass achieved when counter >= 7	Type B, 2 Trips
					Type of vacuum source: CeBBVI_e_ManifoldVacuum			
					With a manifold vacuum source:		Performed every 100 msec	
					Throttle Area (with idle included) for time period of	<= 5.0 Percent for > 3.0 seconds		
					Difference in Brake Booster Vacuum	>= 0.3 kPa		
					For time period of AND	>= 0.2 Seconds		
					Vacuum Delta	>= 15.0 kPa		
					No active DTC's	Fault bundles: MAP_SensorFA TPS_FA BrakeBoosterSensorCktFA		
			1st order lag fail threshold	> 0.20				
			1st order lag re-pass threshold	< 0.5				
					With a mechanical pump vacuum source:			
					No active DTC's	Fault bundles: BrakeBoosterSensorCktFA		
					P057B	Not Active on Current Key Cycle		
					P057C	Not Active on Current Key Cycle		
					P057D	Not Active on Current Key		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Cycle		
					P057E	Not Active on Current Key Cycle		
					Brake pedal position	<= 7.0 Percent for > 3.0 seconds		
					Engine mode	= Run for > 3.0 seconds		
					Difference in Brake Booster Vacuum	>= 0.3 kPa		
					For time period of AND Unfiltered normalized value of measured brake booster vacuum	>= 0.2 Seconds <= **P0556_BBVS_VacLowFlow** kPa (see supporting table)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) ÷ 5 Volts *100	< 5.00 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	320 failures out of 400 samples 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 Illum.
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) ÷ 5 Volts *100	> 95.00 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	2,000 failures out of 2,400 samples 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 Illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS, "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control On Switch Circuit	P0565	Detects a failure of the cruise on/off switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Cancel Switch Circuit	P056C	Detects a failure of the cruise cancel switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Input Circuit	P0575	Determines if cruise switch state received from the BCM is valid.	If x of y rolling count / protection value faults occur, disable cruise for duration of fault	Message <> 2's complement of message Message rollling count<>previous message rolling count value plus one	Cruise Control Switch Serial Data Error Diagnostic Enable Serial communication to BCM Power Mode Engine Running	1.00 No loss of communication = RUN = TRUE	9 failures out of / 17 samples Performed on every received message 9 rolling count failures out of / 17 samples Performed on every received messagw	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	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 > 8.00 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 Illum.
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	Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	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 Illum.
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	20.00	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 Illum.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Performance	P058A	This DTC monitors for a battery module internal fault	Battery Module signals an internal fault via LIN bus VeVITR_e_IBS_InternalFault	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Monitoring Performance	P058B	This DTC monitors for a battery module current fault	Battery Module signals an internal fault via LIN bus VeVITR_e_BatCurrRatDiag	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Monitoring Performance	P058C	This DTC monitors for a battery module temperature fault	Difference between Battery Module raw temperature values	> 10.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Temperature Data Available over LIN bus Internal Temperature Circuit Low Fault Active (P16DE) Internal Temperature	= 1 (1 indicates enabled) = 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = Zero = True = False	8 failed samples within 10 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Circuit High Fault Active (P16DF) Battery Module Temperature Too High Fault Active (P058E) Battery Module Temperature Too Low Fault Active (P058F)	= False = False = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Voltage Monitoring Performance	P058D	This DTC monitors for a battery module voltage fault	Difference between 12V System Reference Voltage and IBS 12V Battery Voltage values	> 5.00 Volts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit IBS Voltage and Current Data Available over LIN bus Battery Monitor Module Circuit Low Voltage Fault Active (P16D4) Battery Monitor Module Circuit High Voltage Fault Active (P16D5)	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True = True = False = False	32 failed samples within 40 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Too High	P058E	This DTC monitors for a battery module temperature too high fault	Battery Module raw temperature 2 value	> 120.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Measure Temperature Data Available over LIN bus	= 1 (1 indicates enabled) = 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = zero = True	4 failed samples within 5 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Too Low	P058F	This DTC monitors for a battery module temperature too low fault	Battery Module raw temperature 2 value	< -43.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Measure Temperature Data Available over LIN bus	= 1 (1 indicates enabled) = 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = Zero = True	4 failed samples within 5 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A 2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. Part 1 failure enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position.	Smart Shutter Actuator 1 Position Response AND Shutter 1 Diagnostic Delay Threshold count	<> Smart Shutter Actuator 1 Commanded Position percent AND Counter > 99.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter1 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1.00 failures out of 1.00 samples 1 sample / 100 milliseconds	Type B, 2 Trips
			Shutter 1 Performance Test count	= 5.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter1 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary 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.	
				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 Illum.
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 Illum.
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.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			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 Illum.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.46472 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system 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)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 6.41 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 159 / 399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_MainCPU_SOH_FltEnbld is: 0 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	360.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 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			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error	3 (results in MIL),		KeMEMD_b_RAM_ECC_	variable,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 >=	5 (results in MIL and remedial action)		CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_ CktTestEnbl is: 1 . (If 0, this test is disabled)	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			KePISD_b_DMA_XferTest Enbld == 1 Value of KePISD_b_DMA_XferTest Enbld is: 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.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main processor	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 = TRUE Engine speed Run Crank voltage	1.00 0.00 RPM 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 = TRUE Engine speed Run Crank voltage	1.00 0.00 RPM 6.41 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 = TRUE Engine speed Run Crank voltage	1.00 0.00 RPM 6.41 volts	8 failures out of 10 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Open	P0627	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage high during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage ≥ 11.00 volts ≥ 0 RPM	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 Illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage low during driver on state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage ≥ 11.00 volts ≥ 0 RPM	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 Illum.
Fuel Pump Relay Control Circuit High Voltage	P0629	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage high during driver off state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage Engine Speed	Voltage ≥ 11.00 volts ≥ 0 RPM	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 Illum.
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 Illum.
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	= 00 or FF	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 Illum.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vref1 and failing the diagnostic when the percent Vref1 is too low or too high or if the delta between the filtered percent Vref1 and non-filtered percent Vref1 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref1 < or ECM percent Vref1 > or the difference between ECM filtered percent Vref1 and percent Vref1 >	4.875 % Vref1 5.125 % Vref1 0.0495 % Vref1	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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 Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controllers P263A may also set (MIL Control Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	4.875 % Vref2 5.125 % Vref2 0.0495 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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 Illum.
Powertrain Relay Control (ODM) Open	P0685	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω ohms impedance between signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Low	P0686	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) High	P0687	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Diagnoses control module relay feedback circuit low voltage	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 Illum.
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay commanded “OFF” No active DTCs:	>= 2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Low Voltage (ODM)	P0691	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	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 Illum.
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 >	4.875 % Vref3 5.125 % Vref3 0.0495 % Vref3	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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 Illum.
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 >	4.875 % Vref4 5.125 % Vref4 0.0495 % Vref4	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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 Illum.
Two Stage Oil Pump Control Circuit Open	P06DA	Controller specific output driver circuit diagnoses the two stage 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 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Two Stage Oil Pump Control Circuit Short To Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Ground	P06DB	Controller specific output driver circuit diagnoses the two stage 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 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 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 (Two Stage Oil Pump Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Power	P06DC	Controller specific output driver circuit diagnoses the two stage 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 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Performance - Two Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y = 15 times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.6 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** + **P0521_P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P0521_P06DD_P06DE_OP_LoStatePressure**)	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 4 errors out of 5 samples. Run once per trip or activiated by the Passive Test	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil Pump in Low State	> 1.6 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Filtered Engine Speed within range	1,400 RPM ≤ Filtered Engine Speed ≤ 2,640 RPM		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C ≤ Oil Temp ≤ 120.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			<u>Fast Pass Condition</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change -	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running	 TRUE ≥ 10.0 seconds	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above a threshold	filtered oil pressure after 1.6 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P0521_P06DD_P06DE_OP_LoStatePressure**)	Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range	≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO CrankSensor_FA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.6 seconds 50.0 deg C ≤ Oil Temp ≤ 100.0 deg C 1,400 RPM ≤ Filtered Engine Speed ≤ 2,640		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit StuckOn - Two Sided	P06DE	Diagnoses the two stage oil pump is stuck in the low pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from a passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.6 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressu** (**re** - **P0521_P06DD_P06DE_OP_LoStatePressure** **) ÷ 2** (see P06DE details on Supporting Tables Tab)	<u>Common Criteria</u>: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria</u>: One Sided Performance	 TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 4 errors out of 5 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Test = Disabled			
					Oil Pump in Low State	> 1.6 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Filtered Engine Speed within range	1,400 RPM ≤ Filtered Engine Speed ≤ 2,640 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DE details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Passive Criteria:			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C ≤ Oil Temp ≤ 120.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab)	TRUE		
			Fast Pass Condition Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.6 seconds] Oil Pressure delta <	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed	 TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P06DD_P06DE_OP_StateChangeMin (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**) / 2 (P06DD Performance Test Details on Supporting Tables Tab)	> 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control : <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Engine Torque within range	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.6 seconds 50.0 deg C ≤ Oil Temp ≤ 100.0 deg C 1,400 RPM ≤ Filtered Engine Speed ≤ 2,640 RPM **P06DD_P06DE_MinEnableTorque_OP** ≤		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (P06DD Performance Test Details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request message to determine when the TCM has detected a MIL illuminating fault.	Transmission Control Module Emissions-Related DTC set and module is requesting MIL	Transmission Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	2,000.00 msec from Park 2,000.00 msec from Reverse 2,000.00 msec from Drive	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	2,000.00 msec from Park 2,000.00 msec from Neutral* 2,000.00 msec from Drive* *Internal does not diagnose from N&D	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB =FALSE = TRUE	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B, One Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	2,000.00 msec from Reverse 2,000.00 msec from Neutral 2,000.00 msec from Drive	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	2,000.00 msec from Park 2,000.00 msec from Reverse 2,000.00 msec from Neutral	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($1C7/$1C9 for engine torque, $1CA/$1C6 for axle torque)	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = True = Traction Present	>= 8 failures out of 10 Performed on every received message	Type C, No SVS Safety Special Type C
			OR Serial Communication message ($1C7/$1C9 for engine torque, $1CA/ $1C6 for axle torque) rolling count index value	Message rolling count value <> previous message rolling count value plus one			8 rolling count failures out of 10 samples Performed on every received message	
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 ms	
			Torque request greater than torque request diagnostic maximum threshold	> 250 Nm for engine torque based traction torque system, OR > 4,000 Nm for axle torque based traction torque system			>= 4 out of 10 samples Performed on every received message	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Reset Signal Message Counter Incorrect	P1000	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Reset Signal	Communication of the Alive Rolling Count or Protection Value from the FPDCM over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
Fuel Pump Driver Control Module System Voltage Performance (Only on applications that use an FTZM)	P1002	Detects low system voltage performance of the fuel pump driver control module system. This diagnostic reports the DTC when the absolute value of the difference between the fuel pump driver battery voltage and the fuel pump driver run/crank voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Run Crank voltage low and high	ABS (Fuel Pump Driver Control Module Battery voltage - Fuel Pump Driver Control Module Run Crank voltage) > 3.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Performance diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available FTZM Run Crank Active is TRUE Starter motor not engaged Sensor Bus relay is commanded ON	= 1	40 failures out of 50 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 Illum.
Fuel Pump Driver Control Module Reset Error	P1005	This DTC monitors for a reset error in the Fuel Pump Driver Control Module	If the received value for the time since the last FPDCM reset has reset and the newly received value or previous value is for out of total samples	<= 0.50 seconds >= 6.00 counts >= 400.00 counts	DTC is enabled Sensor bus relay Battery voltage P1000 U18A2	1.00 (1 indicates enabled) On > 11.00 Volts Not active Not active	Diagnostic runs in 50 ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Ignition Switch Run/ Start Position Circuit High (Only on applications that use an FTZM)	P1007	Detects high voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit high	FTZM Run Crank Active is TRUE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = FALSE	72 failures out of 80 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 Illum.
Fuel Pump Driver Control Module Temperature (Fuel Tank Zone Module) Too High Signal Message Counter Incorrect	P1009	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module (FTZM) Temperature Too High Signal Message	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Driver Control Module over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 100ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Erratic	P100C	This DTC monitors for an erratic Temperature signal via LIN bus from the Battery Monitor Module	Communication of the Temperature signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	>= 4 counts >= 5 counts	The diagnostic is enabled All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= 1 (1 indicates enabled) >= 3,000.00 milliseconds = Run >= 11.00 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 Illum.
Battery Monitor Internal Temperature Circuit Erratic	P100D	This DTC monitors for an erratic Temperature Circuit signal via LIN bus from the Battery Monitor Module	Communication of the Temperature Circuit signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	>= 4 counts >= 5 counts	The diagnostic is enabled All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= 1 (1 indicates enabled) >= 3,000.00 milliseconds = Run >= 11.00 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 Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A Low	P1015	This monitor checks if the Reductant Control Module SENT Sensor protocol is out of range low	The SENT Message Rolling Pulse Count is provided to the ECM by the DEF-C via CAN bus. This monitor detects a Low Circuit Fault in the SENT Communication Circuit.	SENT Message Rolling Pulse Count sample equals to the previous sample AND Sent Circuit Low Error Message equals to TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 50.00 fails out of 62.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A High	P1016	This monitor checks if the Reductant Control Module SENT Sensor protocol is out of range high	The SENT Message Rolling Pulse Count is provided to the ECM by the DEF-C via CAN bus. This monitor detects a High Circuit Fault in the SENT Communication Circuit.	SENT Message Rolling Pulse Count sample equals to the previous sample AND Sent Circuit High Error Message equals to TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 50.00 fails out of 62.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A Performance	P1017	This monitor checks if the Reductant Control Module SENT Sensor protocol has performance problems	The SENT Message Rolling Pulse Count and the Reductant Quality Sensor SENT Message Age are provided to the ECM by the DEF-C via CAN bus. This monitor checks if the DEF-C recognizes an error in the SENT trasmission and if the age time is coherent with the Rolling Pulse Count increment.	At least one of the following conditions to be verified: 1. SENT Message Rolling Pulse Count sample is different from the previous sample AND Reductant Quality Sensor SENT Message Age > 1.00 s 2. A SENT Fault is present	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF Quality Sensor SENT circuit	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_SENT_ElecFlt == FALSE	Time counter: 50.00 fails out of 62.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor 5V Supply Circuit Short to Ground	P1018	This diagnosis verifies DEF Quality Sensor 5V Supply Circuit pin for Short to Ground	The DEF QS 5V Supply Circuit Short to Ground flag is provided to the ECM by the DEF-C via CAN bus. This monitor checks if there is a short circuit to ground on DEF Quality Sensor 5V Supply Circuit pin.	DEF QS 5V Supply Circuit Short to Ground flag status == TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor 5V Supply Circuit Short to Battery	P1019	This diagnosis verifies DEF Quality Sensor 5V Supply Circuit pin for Short to Battery	The DEF QS 5V Supply Circuit Short to Battery flag is provided to the ECM by the DEF-C via CAN bus. This monitor checks if there is a short circuit to battery on DEF Quality Sensor 5V Supply Circuit pin.	DEF QS 5V Supply Circuit Short to Battery flag status == TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Return Circuit Short to Battery	P101A	This diagnosis verifies DEF Quality Sensor Return Circuit pin for Short to Battery	The DEF QS Ground Circuit Short to Battery flag is provided to the ECM by the DEF-C via CAN bus. This monitor checks if there is a short circuit to battery on DEF Quality Sensor Return Circuit pin.	DEF QS Ground Circuit Short to Battery flag status == TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 FCBR_e_ChassisFuelPressSysType c) Diagnostic Enabled - KeFABR_b_OpenCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	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 Illum.
		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 Illum.
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	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	a) Device configuration FCBR_e_ChassisFuelPresSysType b) Diagnostic KeFABR_b_GshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	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 Illum.
		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-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.	Phased-pair circuit voltage	V [back-EMF] >= 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPresSysType c) Diagnostic KeFABR_b_GshtCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	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 Illum.
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	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	a) Device configuration FCBR_e_ChassisFuelPresSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	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 Illum.
		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-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.	Phased-pair circuit voltage	V[backEMF] > 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	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 Illum.
Reductant Pump Driver High Temperature	P103F	This diagnosis verifies that the Motor Mosfet Driver Temperature is too High	Motor Mosfet Driver Temperature too High Error status == FAULT	VeSCRR_e_PmpDrvrHiTemp == FAULT	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN communication Motor Mosfet Driver Temperature too High Error status provided by DEF control module different from INDETERMINATE	1.00 [Boolean] > 11.00 [V] U010E, Lost Communication With Reductant Control Module	40.00 failures out of 50.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump A Control Circuit Shorted	P1040	This diagnosis verifies that the DEF pump phases are shorted	Motor Pump Phases Shorted Error status provided by DEF control module == FAULT	VeSCRR_e_PmpMtrShorted==FAULT	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN comunication Motor Pump Phases Shorted Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	20.00 failures out of 25.00 samples Time basis = 100ms/sample	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Injection Valve Supply Voltage Circuit High Bank 1 Unit 1	P1049	This diagnosis verifies if a DEF dosing valve high side short to power occurred	HWIO interface DEFMV_ENABLE_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor-Invalid Range	P1050	This diagnosis verifies that the DEF level sensor raw signal is not within plausible range	DEF level sensor raw value is not within calibrated range (for discrete level sensor, each discrete level has its plausible range) Supply voltage parcentage is outside of the following ranges:	(2.00 ; 5.50) [%] (17.30 ; 22.00) [%] (32.90 ; 38.80) [%] (63.10 ; 69.40) [%]	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN communication No electrical faults on DEF level sensor Discrete Level sensor used	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFLS_ElecFltSt == FALSE CeSCRI_e_DEF_LvlSnsr Discrete == CeSCRI_e_DEF_LvlSnsr Discrete	80.00 failures out of 100.00 samples Time basis = 100ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Driver Over Temperature Fault	P1051	This diagnosis verifies if the driver of the DEF tank heater is affected by overtemperature	Tank Heater driver over temperature flag reports a fail	VeSCRR_e_HeatA_OverTemp == CeSCRR_e_fault	Test enabled by calibration Temperature used by the heating strategy to switch on the heaters Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN communication DEF Temperature sensor not in fault Tank Heater driver over temperature flag different from INDETERMINATE	1.00 < 60.00 [°C] > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) (GetCANR_b_LostComm_FltN= FALSE) SCR_DEFTS_FA == FALSE	8.00 failures out of 10.00 samples Time basis = 500ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Driver Over Temperature Fault	P1052	This diagnosis verifies if the driver of the DEF dosing line heater is affected by overtemperature	Line Heater driver over temperature flag reports a fail	VeSCRR_e_HeatB_OverTemp == CeSCRR_e_fault	Test enabled by calibration Temperature used by the heating strategy to switch on the heaters Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN communication Line Heater driver over temperature flag different from INDETERMINATE	1.00 == TRUE < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	8.00 failures out of 10.00 samples Time basis = 500ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump A Speed Low	P105A	This diagnosis verifies that the DEF pump rotor is stalled	DEF pump commanded to move forward or reverse AND DEF Pump Motor speed within calibrated range	VeSCRR_n_PmpMtrSpd > -650.00 AND VeSCRR_n_PmpMtrSpd < 650.00	Test enabled by calibration Engine is not cranking Battery voltage Key on (OR engine running) PWM_pump_command not in fault DEF motor pump not in fault No loss of CAN communication Tank Defrost phase completed DEF pump commanded to move forward or reverse	1.00 > 11.00 [V] SCR_DEF_PumpCmdFA == FALSE SCR_DEFPM_FA == FALSE U010E, Lost Communication With Reductant Control Module (SCR) pct duty cycle inside: (39.00 ; 81.00) [%] or (11.00 ; 31.00)[%]	160.00 failures out of 200.00 samples Time basis = 25ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Signal Message Counter Incorrect	P1100	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 2 Signal Message Counter	Communication of the Fuel Level Sensor 2 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
Engine Coolant Temperature Sensor Not Plausible	P111E	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.	**Sensor usage definitions:** **Sensor1 =** CeECTR_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_IAT_Snsr **Sensor3 =** CeECTR_e_OAT_Snsr ================== A failure will be reported if any of the following occur: 1) Sensor1 power up absolute temp difference to Sensor2 and Sensor3 is (Sensor1 fast fail) . 2) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: (and a block heater has not been detected) 3) Sensor1 power up temp is lower than Sensor2 and Sensor3 by this amount: 4) Sensor1 power up temp is ≥ Sensor2 and	 ≥ 15.8 ºC ≥ 15.8 and < 15.8 ºC ≤ 15.8 Deg ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag ================== Block Heater detection is **enabled** when either of the following occurs: 1) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: 2) Cranking time ==================	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 28,800 seconds > 25,200 seconds = Not occurred = False = False = False ≥ -9 ºC = False ================== ≥ 15.8 ºC and < 15.8 ºC < 10.0 Seconds ==================	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sensor3 by 15.8 ºC and the time spent cranking the engine without starting is ≥ 10.0 seconds with the LowFuelConditionDiag	= False	Block Heater is **detected** and diagnostic is aborted when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints 1b) Drive time 1c) Vehicle speed 1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows: 1e) IAT drops from power up IAT 2a) ECT monitoring is enabled after engine start in the following engine run time window 2b) Sensor1 temp derivative during the test is: 2c) Consectutive samples of 2b) being true are: ========== Diagnostic is **aborted** when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Engine off time (i.e. auto stop) during Block heater detection	 > 5 Seconds with > 0.0 MPH and 0.00 times the seconds with vehicle speed below 1b ≥ 100.0 ºC 1.0 <= seconds <= 40.0 < -0.10 ºC/sec ≥ 4 samples ========== ≥ 1,800 Seconds ≥ 300.0 Seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	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 Illum.
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 > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	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 Illum.
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 > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Command Signal Message Counter Incorrect	P11FF	This DTC monitors for an error in communication with the Fuel Pump Command Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
Fuel Level Sensor 1 Signal Message Counter Incorrect	P1200	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 1 Signal Message Counter	Communication of the Fuel Level Sensor 1 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
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 enabled [KeFABR_b_OvertempDiagEnbl] 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) == TRUE 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 Illum.
Fuel Rail Pressure (FRP) Sensor B Circuit Low Voltage	P127C	Determine when a short circuit to ground affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.3 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 ≥ 15 s > 8.4 V	38 failures out of 55 samples OR 22 continuous failures out of 55 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor B Circuit High Voltage	P127D	Determine when a short circuit to voltage affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 94.8 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 ≥ 15 s > 8.4 V	38 failures out of 76 samples OR 22 continuous failures out of 76 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Ignition Switch Run/ Start Position Circuit Low (Only on applications that use an FTZM)	P129D	Detects low voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage is below a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit low	FTZM Run Crank Active is FALSE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = TRUE	72 failures out of 80 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 Illum.
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 Enabled FABR Speed Rationality Diagnostic 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) == TRUE b) == TRUE c) <> TRUE d) <> TRUE e) <> TRUE f) <> TRUE g) > 11.00 volts h) == TRUE j) <> TRUE k) <> TRUE l) <> TRUE m) > 0.90 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 Illum.
		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 Illum.
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 enabled [KeFABR_b_FuelCntrlEnblDiagEnbl] b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARC_ChkErr] c) CAN Sensor Bus message $0CC_Available d) Sensor Bus Relay On e) Timer [FABR_t_RunCrankActive]	a) == TRUE 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 Illum.
Ignition Run/ Start Voltage Signal Message Counter Incorrect	P130F	This DTC monitors for an error in the Ignition Run/Start Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding EGR valves, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the EGR flow response time.	Error difference (absolute value) between the desired EGR rate and the actual EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140B: Increasing EGR slow response threshold** [%]	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one OBD Coolant Enable Criteria Throttle measured position Outside air temperature	**P140B, P140C: EGR slow response enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0.50 [s] > 0 [%] ==TRUE ==TRUE > 90.00 [%] > -9.00 [°C]	Test is evaluated after the enabling conditions are satisfied for a number of samples >= 200.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 74.80 [kPa]		
					Engine speed in range	> 1,500.00 [rpm] AND < 3,500.00 [rpm]		
					Desired fuel quantity in range	> 10.00 [mm^3] AND < 50.00 [mm^3]		
					Exhaust manifold pressure in range	> 120.00 [kPa] AND < 350.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> -45.00 [mg/s] AND < -8.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	< 0 [mg]		
					EGR valve position OR it is above that threshold for a time	<= 75.00 [%] >= 0.20 [s]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal EGR valve total			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the EGR system that lead to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding EGR valves, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the EGR flow response time.	Error difference (absolute value) between the desired EGR rate and the actual EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140C: Decreasing EGR slow response threshold** [%]	Calibration on diagnostic enabling	**P140B, P140C: EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>= 200.00 sampling time is 25ms	
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 0.50 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					OBD Coolant Enable Criteria	==TRUE		
					Throttle measured position	> 90.00 [%]		
					Outside air temperature	> -9.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 74.80 [kPa]		
					Engine speed in range	> 1,500.00 [rpm] AND < 3,500.00 [rpm]		
					Desired fuel quantity in range	> 8.00 [mm^3] AND < 50.00 [mm^3]		
					Exhaust manifold pressure in range	> 120.00 [kPa] AND < 350.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> 8.00 [mg/s] AND < 42.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	> 0 [mg]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 vs IAT2 (MAT) Not Plausible	P1428	The power up temperature varies too much from reference sensor after long soak. At start up, after a long enough soak time to stabilize temperatures, the EGR 1 temp sensor is compared to the MAT temp sensor. If the temperature delta is above an allowed operating threshold the sensor is determined to be faulted.	If the power up initial value of the temp sensor varies more than allowed from the reference temp sensor.	Temperature Delta from MAT. at power up > 20 C	Engine soak (not run) time No P codes Ignition switch	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119 Crank or Run	NA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 vs IAT2 (MAT) Not Plausible	P142A	The power up temperature varies too much from reference sensor after long soak. At start up, after a long enough soak time to stabilize temperatures, the EGR 2 temp sensor is compared to the MAT temp sensor. If the temperature delta is above an allowed operating threshold the sensor is determined to be faulted.	If the power up initial value of the temp sensor varies more than allowed from the reference temp sensor.	Temperature Delta from MAT at power up > 20.00 C	Engine soak (not run) time No P codes Ignition switch	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119 Crank or Run	NA	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
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 Illum.
					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 Illum.
Communication Error with Active Grill Air Shutter Module “A”	P151E	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module A	Communication of the Alive Rolling Count from the Shutter Module A over LIN bus is incorrect or the Shutter Module A signals has an internal error for out of total samples	 >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 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 Illum.
Adaptive Cruise Control Signal Circuit	P1553	Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable adaptive cruise control for duration of fault		Adaptive Cruise Control Command Serial Data Error Diagnostic Enable	1.00	9 / 17 counts	Type B, 2 Trips , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undetermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 3.0 seconds			fail continuously for greater than 3.0 seconds	Type C, No SVS, "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Signal Message Counter Incorrect	P155E	This DTC monitors for an error in communication with the DC/DC Converter Actuator Voltage Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 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 Illum.
DC/DC Converter Performance Signal Message Counter Incorrect	P155F	This DTC monitors for an error in communication with the DC/DC Converter Internal Health Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 25ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Signal Message Counter Incorrect	P156D	This DTC monitors for an error in communication with the DC/DC Converter Run/ Crank Terminal Status Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 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 Illum.
DC/DC Converter Crank Control Signal Message Counter Incorrect	P156E	This DTC monitors for an error in communication with the DC/DC Converter Crank Control Terminal Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 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 Illum.
Sensor Bus Relay Feedback Circuit High Voltage	P157A	This DTC checks that the Sensor Bus Relay output is not stuck high	The Sensor Bus Relay ouput is stuck high	>= KeSBRR_Cnt_SB_RlyStkHiFailThrsh within KeSBRR_Cnt_SB_RlyStkHiSmplThrsh samples	The Sensor Bus Relay output has been inactive	>= KeSBRR_t_SB_RelayCommandedOff		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Calibration Incorrect	P158A	Type of cruise in Body Control Module does not match that in the Engine Control Module for 2.5 seconds	Type of cruise system in GMLAN $4E9 does not match with that in the Engine Control Module for a fix time.	2.5 seconds	DID $40 from BCM says cruise system is present (ECM recieves programmble information from Body Control Module) OR ECM will not receive Programmable information for Cruise from Body Control Module	True	fail continuously for greater than 2.5 seconds.	Type C, No SVS "Emissions Neutral Diagnostics – Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit Low	P159F	This DTC will detect an analog mode switch input that is too low out of range.	For button type Normal_Button Analog Mode Switch low voltage threshold % of 5V range For button type Enhanced_Button Analog Mode Switch low voltage threshold % of 5V range For button type Mulitple_Button Analog Mode Switch low voltage threshold % of 5V range	< 29.00 % < 24.30 % < 21.20 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit High	P15A0	This DTC will detect an analog mode switch input that is too high out of range.	For button type Normal_Button Analog Mode Switch high voltage threshold % of 5V range For button type Enhanced_Button Analog Mode Switch high voltage threshold % of 5V range For button type Mulitple_Button Analog Mode Switch high voltage threshold % of 5V range	 >= 88.80 % >= 94.10 % >= 95.30 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Performance	P15A1	This DTC will detect an analog mode switch input that is in an indeterminate range.	For button type Normal_Button Analog Mode Switch indeterminate region % of 5V range For button type Enhanced_Button Analog Mode Switch indeterminate regions % of 5V range For button type Mulitple_Button Analog Mode Switch indeterminate regions % of 5V range	66.80 % ≤ % of 5 volts < 72.80 % 63.50 % ≤ % of 5 volts < 65.50 % 83.50 % ≤ % of 5 volts < 85.50 % 52.90 % ≤ % of 5 volts < 54.10 % 74.10 % ≤ % of 5 volts < 75.30 % 87.50 % ≤ % of 5 volts < 88.60 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal	Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1E over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 15 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 16 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			the Battery Monitor Module in frame 17 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count from the Battery Monitor Module in frame 18 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count from the Battery Monitor Module in frame 19 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1D over LIN bus is incorrect or the					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1A over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1B over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1C over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			out of total samples	>= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Pressure Regulator 1 Control Performance	P163A	Determine when commanded current for Fuel metering Unit valve is out of expected current range.	Current flowing through fuel metering unit valve OR Current flowing through fuel metering unit valve	> 2.80 A < 0.05 A	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_MU_DrvrCloseTFTKO FHP_MU_DrvrOpenTFTKO	160 failures out of 250 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 Illum.
Internal Control Module Pressure Regulator 2 Control Performance	P163B	Determine when commanded current for Rail Pressure Regulator valve is out of expected current range.	Current flowing through pressure regulator valve OR Current flowing through pressure regulator valve	> 2.80 A < 0.05 A	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_PR_DrvrCloseTFTKO FHP_PR_DrvrOpenTFTKO	160 failures out of 250 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 Illum.
Sensor Reference Voltage Status Message Counter Incorrect	P165C	This DTC monitors for an error in communication with the Sensor Reference Voltage Status Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
Battery Voltage Signal Message Counter Incorrect	P167F	This DTC monitors for an error in the FTZM Battery Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	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 Illum.
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 > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 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 Illum.
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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 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 Illum.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage - (GEN III Controllers ONLY)	P16B3	Diagnoses ignition feedback circuit 2 high voltage	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 Illum.
Battery Monitor Module Circuit Low Voltage	P16D4	This DTC monitors for a battery module low voltage circuit fault	Battery Module signals a low voltage circuit fault via LIN bus VeVITR_U_12VBattVolt	< 3.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit High Voltage	P16D5	This DTC monitors for a battery module high voltage circuit fault	Battery Module signals a high voltage circuit fault via LIN bus VeVITR_U_12VBattVolt	> 26.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Low	P16D6	This DTC monitors for a battery module current low fault	Battery Module signals a current low fault via LIN bus VeVITR_I_12VBattCurrRaw	< -1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit Low	P16D8	This DTC checks that the Sensor Bus Relay output circuit is not shorted to ground	The Sensor Bus Relay output circuit is shorted to ground	>= KeSBRD_Cnt_RlyGshtFail within KeSBRD_Cnt_RlyGshtSmpl samples	The Sensor Bus Relay Commanded Output state	= Off		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit High	P16D9	This DTC checks that the Sensor Bus Relay output is not shorted to power	The Sensor Bus Relay output circuit is shorted to power	>= KeSBRD_Cnt_RlyPsht Fail within KeSBRD_Cnt_RlyPsht Smpl samples	The Sensor Bus Relay Commanded Output state	= On		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Module Monitor Timer Performance	P16DC	This DTC monitors for a battery module timer performance fault	Battery Module shall fail when either of the following criteria are met. Case 1: Wake Up Test A: LIN Bus Off Timer / 1,800.00 seconds or B: (LIN Bus Off Timer + 1,800.00 seconds) / 1,800.00 seconds or C: (LIN Bus Off Timer - 1,800.00 seconds) / 1,800.00 seconds Case 2: Sequential Test Sequential Test is enabled	If the calculated wakeup value is smaller than 24.00 counts, then the smaller value will be outputed. If the calculated wakeup value is greater than 24.00 counts, then the calibration itself is outputed. If any outputs above are not not equal to the IBS maximum down counter counts, the diagnostic fails. This portion of the diagnostic is not used. = 0 (1 indicates enabled)	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit Historical Temperature Data Trigger Request Module Off Timer Fault Active Run Crank Low Timer Error Code Clear Request IBS Measure Temperaure Data Available	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True = 1 (initializes to 0 then transitions to 1 once data is available- NEED TO SEE POSITIVE RISING EDGE) = False = False = False (latched when set True) = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TPTKO OR TFTKO IBS Down Counter Value Spurious Reset	= False (when KeVITD_b_TimerPerf_DFIRDisable = 0) Calibration is set to 0 Not equal to 25.00 = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current High	P16DD	This DTC monitors for a battery module current high fault	Battery Module signals a current high fault via LIN bus VeVITR_I_12VBattCurrRaw	> +1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit Low	P16DE	This DTC monitors for a battery module internal temperature circuit low fault	Battery Module raw temperature 1 value	> 120.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Measure Temperature Data Available over LIN bus	= 1 (1 indicates enabled) = 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 or zero = zero = True	4 failed samples within 5 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit High	P16DF	This DTC monitors for a battery module internal temperature circuit high fault	Battery Module raw temperature 1 value	< -43.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Measure Temperature Data Available over LIN bus	= 1 (1 indicates enabled) = 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = zero = True	4 failed samples within 5 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Random Access Memory (RAM) Error	P16E1	This DTC monitors for a battery module RAM memory fault	Battery Module signals a RAM memory fault via LIN bus VeVITR_e_IBS_IntRAM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Read Only Memory (ROM) Error	P16E2	This DTC monitors for a battery module ROM memory fault	Battery Module signals a ROM memory fault via LIN bus VeVITR_e_IBS_IntROM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Data Incompatible	P16E3	This DTC monitors for a battery module data incompatible fault	Battery Module data received over LIN bus is incompatible. (Measured by any of the following)		The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled	= 1 (1 indicates enabled) = 1 (1 indicates enabled)	Diagnostic runs in the 250 ms loop	Type B, 2 Trips
			Historical Test	Upon IBS wakeup, if any of the below Historical Test conditions are satisfied, the diagnostic fails.	System Diagnostics Disabled Power Mode 12V System Reference Voltage	= False Not equal off > 9.00 Volts		
			Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 80.00 Ah)	> 5.00 Ah	LIN Bus Off or Battery Module Communication Faults Active	= False		
			or IBS Returns a battery type that is not equal to	CeBSER_e_IBS_Cfg BatAGM	Outside Air Temperature	> -20.00 Celsius and < 50.00 Celsius		
			or		Outside Air Temperature Validity Bit	= True		
			Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.08 V)	> 0.50 Volts	IBS Configuration Data Available over LIN bus Historical Test Only Host Controller MEC Counter	= True <= 0		
			or Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.64 V)	> 0.50 Volts				
			Continuous Test	If any of the below conditions are satisfied for 16.00 fail counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				out of 20.00 sample counts, the diagnostic fails.				
			Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 80.00 Ah) or IBS Returns a battery type that is not equal to or Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.08 V) or Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.64 V)	> 5.00 Ah CeBSER_e_IBS_Cfg BatAGM > 0.50 Volts > 0.50 Volts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	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 before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	39 / 399 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	159 / 399 counts continuous; 12.5 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 Illum.
Internal Control Module Redundant Memory Performance (Diesel)	P16F3	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.	Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM, Vehicle Speed). See supporting tables: min (**P16F3_Speed Control External Load f(Oil Temp, RPM)** , Sum (**P16F3_Speed Control External Load Max f (Vehicle Speed, RPM)** , **P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 84.83 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit Open	P171A	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for an open circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission surge accumulator control circuit impedance	≥ 200 K Ω impedance between signal and controller ground	battery voltage AND battery voltage update battery enable time run/crank voltage diagnostic monitor enable	≥ 7.00 volts ≤ 32.00 volts ≥ 6.00 volts = 1 Boolean	fail time ≥ 0.188 seconds out of sample time ≥ 0.250 seconds 25 milliseconds update rate battery enable time ≥ 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	transmission surge accumulator control circuit impedance	≤ 0.5 Ω impedance between signal and controller ground	battery voltage AND battery voltage update battery enable time run/crank voltage diagnostic monitor enable	≥ 7.00 volts ≤ 32.00 volts ≥ 6.00 volts = 1 Boolean	fail time ≥ 0.188 seconds out of sample time ≥ 0.250 seconds 25 milliseconds update rate battery enable time ≥ 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit High	P171C	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a short to power circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission surge accumulator control circuit impedance	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage AND battery voltage update battery enable time run/crank voltage diagnostic monitor enable	≥ 7.00 volts ≤ 32.00 volts ≥ 6.00 volts = 1 Boolean	fail time ≥ 0.069 seconds out of sample time ≥ 0.081 seconds 25 milliseconds update rate battery enable time ≥ 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	≥ 12 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 Illum.
					counter must achieve it's fail threshold in less than the time-out time. ********** If vehicle is launched then: Transmission gear ratio Trans 1st gear ratio high Trans 1st gear ratio low Trans gear ratio not 1st gear high Trans gear ratio not 1st gear low Valid transmission gear ratio achieved time OR If vehicle is not launched but autostart occurs then: Turbine speed Turbine speed less then above threshold for Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in	 = 4.5600 1st gear ratio = 2.9700 2nd gear ratio = 2.0700 3rd gear ratio = 1.6800 4th gear ratio = 1.2700 5th gear ratio = 1.0000 6th gear ratio ≤ 1.120 times 1st gear ratio ≥ 0.880 times 1st gear ratio ≤ 1.070 times gear ratio ≥ 0.930 times gear ratio ≥ 0.500 seconds ≤ 5.00 RPM ≥ 0.500 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
Transmission Range Sensor - Transmission Range Control Module Correlation	P1769	Detects misalignment between the Transmission Mode Position and the TRCM Position sensors.	TCM Transmission Mode Position is compared to the TRCM Rotary Sensor Range Position	TCM Mode Position ≠ TRCM Position	CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	=False =False =True = True =True =Park =False	278 failures out of 348 samples 12.5 ms loop	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powerflow Engaged Signal Message Incorrect	P1772	Detects error on ARC & PV reported by CHCM/ ECM about signal $197 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for at least 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IMS State Signal Message Incorrect	P1773	Detects error on ARC & PV reported by CHCM/ ECM about signal $197 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for > 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Chassis Control Module ETRS General Status Message Incorrect	P1774	Detects error on ARC & PV reported by CHCM/ ECM about signal from TRCM to CHCM Message $209 on CE Bus	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Controler On Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	> 3,000 ms within proper operating range for 3,000 msec for 3,000 msec	8 failures out of 10 samples in a Signal in 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Availability Signal Message Incorrect	P1778	Detects error on ARC & PV reported by CHCM / ECM about signal $3F5 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples Signal in the 250 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Default To Park Status Signal Message Incorrect	P177A	Detects when an error is reported by CHCM / ECM as receivers of a message from Default to Park on LIN	Gen 1 ETRS: DTP to CHCM, Message $21 Gen 2 ETRS: DTP to ECM, Message $05	Indicates an Error OR ARC Error	Controler On Ignition Diagnostics Enable calibration:	> 3,000 ms = Run/Crank OR = Accessory =True	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	Actual Tranmission Range Range Change Achievement Diag	= Good value = Not running	0 ms	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Position not Plausible	P178A	Compares Commanded Range in CHCM/ECM to IMS - Transmission Internal Mode Switch	Commmanded Range	≠ Actual Transmission Range IMS 800 msec	Diagnostic Enable Calibration AND 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	269 failures out of 336 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Default to Park Supplemental Power Supply Life	P178B	Detects when the Supplemental Power Capacitors fail to have enough energy to supply the DTP when power has been lost. The diagnostic test is done during vehicle key off. The diagnostic test is reported as “failed” immediately after the DTP SOH (=State Of Health) Test failure is detected. Diagnostic test is reported as “passed” if only if the DTP SOH Test passes.	Capacitor not charged at start of test such that Capacitor voltage	< = 8.00 Volts	Test does not start unless on key up capacitors have had time to charge Test starts when vehicle is in key down and when Ignition transitions DTP Diagnostics Enabling calibration= The shutdown of ICCM / ECM: System diagnostics enabling: Temperature measurement faults: Default To Park Arming Fault:	> 5.00 seconds from On to Off =True =not enabled yet =True =Inactive =Inactive	1 test failure	DTC Type B 2 trips
			Capacitor does not discharge such that the ratio of Start of Test Voltage and End of Test Voltage is:	> 1.10 ratio	Test does not start unless on key up capacitors have had time to charge Test starts when vehicle is in key down and when Ignition transitions Calculated Capacitor Time Constant is calculated when Capacitor voltage If voltage is not reached then calculated when time from start of test is	> 5.00 seconds from On to Off < = 8.00 Volts > = 60.00 Seconds	1 test failure	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTP Diagnostics Enabling calibration= The shutdown of ICCM / ECM: System diagnostics enabling: Temperature measurement faults: Default To Park Arming Fault:	=True =not enabled yet =True =Inactive =Inactive		
			Calculated Capacitor Time Constant (K) is outside of the expected range for the time constant of the capacitor, that is: K	> (Constant K 30.50 x Temp Factor) + High Delta K 30.00 OR: < (Constant K 30.50 x Temp Factor) - Low Delta K 0.00 Temp Factor ranges from 0.98 to 1.27	Test does not start unless on key up capacitors have had time to charge Test starts when vehicle is in key down and when Ignition transitions Calculated Capacitor Time Constant is calculated when Capacitor voltage DTP Diagnostics Enabling calibration= The shutdown of ICCM / ECM: System diagnostics enabling: Battery Voltage	> 5.00 seconds from On to Off < = 8.00 Volts =True =not enabled yet =True =within operating range	1 test failure	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Temperature measurement faults: Default To Park Arming Fault:	=Inactive =Inactive		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Backup Park Performance	P178C	CASE 1: Detects when the DTP is activated and Park not reached CASE 2: Detects when an intrusive DTP is activated, and fails to engage Park	When DTP is activated and Transmission Range	≠ Park	DTP Diagnostic Test Enabling calibration Not Fault Active DTP Diagnostics Enabling Calibration The shutdown of ICCM / ECM: System diagnostics enabling: Battery voltage is Temperature measurement faults: Default To Park Arming fault	=True P0562, P17AE, U18AC, P1774, P177A, U1343, U0077 =True =not enabled yet = True =within operating range =inactive = inactive	2 seconds	DTC Type B Two Trips
			When DTP is activated due to an Intrusive Test and Transmission Range	≠ Park	DTP Diagnostic Test Enabling calibration Not Fault Active Parameters that dictate when an intrusive test is initiated: Time since last test Commanded Range Percent Grade	=True P0562, P17AE, U18AC, P1774, P177A, U1343, U0077 >= 360,000 seconds = From Drive < from 5.00 to 20.00 depending on Temp	2 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR: Time since last test Commanded Range Percent Grade OR: Time since last test Commanded Range Percent Grade: Battery voltage is	> 446,400 seconds = From Any < from 5.00 to 20.00 depending on Temp > 532,800 seconds = From Any No restriction = in operating range		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Default to Park Performance	P178D	Detects the relatching of DTP release spring	After a DTP activation, then DTP Gear = Armed, then Over-travel and new Range commanded and after >0 seconds	And Transmission does not stay in commanded range	DTP Performance Diagnostics Enababling Calibration Not Fault Active Battery Voltage Power mode:	=True P0562, P17AE, U18AC, P1774, P177A, U1343, U0077 is in operating range =RUN or CRANK	3 seconds	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Backup Park Actuator Arming Performance	P178E	Detects errors in the Default to Park Gear status. Works in Case 1 OR Case 2.	Issue with DTP gear armed when DTP has been activated: DTP Gear AND DTP Command	 = Armed = Activate DTP	DTP LIN Bus System Voltage Low fault: System diagnostics: DTP Performance Diagnostics Enabling calibration Not Fault Active Battery Voltage DTP Command = Activate DTP	=Not faulted =Not active =Enabled =True P0562, P17AE, U18AC, P1774, P177A, U1343, U0077 is in operating range > 1 sec	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two Trips
			Issue when DTP gear is unarmed when commanded to be armed: DTP Gear AND DTP Command	 = Unarmed = Arm	DTP LIN bus System Voltage Low fault: System diagnostics: DTP Performance Diagnostics Enabling calibration Not Fault Active Battery Voltage DTP Command = Arm	=Not faulted =Not active =Enabled =True P0562, P17AE, U18AC, P1774, P177A, U1343, U0077 is in operating range > 1 sec	80 failures out of 100 samples 12.5 ms loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Backup Park Lock Actuator Supply Voltage Circuit Low	P17CF	Determines if the Power Train Relay that supplies power to the DTP has been incorrectly switched off	Run Crank Switched Battery OR PowerTrain Relay Switched Battery OR Run Crank DTP Power on LIN Lost	=Active =Off =On = Off =Active =True	Not Fault Active Battery Voltage Time mismatch has been present Low Supply Voltage Diagnostics Enabling calibration System diagnostics System Voltage Low fault:	P0562, P17AE, U18AC, P1774, P177A, U1343, U0077 is in operating range > 1 sec =True Enabled Not active	80 failures out of 100 samples 12.5 ms loop	Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Slow Response	P17D5	The TRCM Slow Response Fault diagnostic test determines if the TRCM takes a long time to shift to the required range.	Time taken to achieve the requested range	> calibrated time specific to the range change	TRCM Wakeup time TRCM Slow Response Diagnostics Enabling calibration: System diagnostics TRCM detected position TRCM Detected position message	> 3.00 sec =True =enabled =is available, valid, usable and not undefined =does not have a rolling count (ARC) or protection value (PV) error.	P-R > 2.00 sec P-N > 2.00 sec P-D> 2.00 sec R-P> 2.00 sec R-N> 2.00 sec R-D> 2.00 sec N-P> 2.00 sec N-R> 2.00 sec N-D> 2.00 sec	Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Primary Signal Message Counter Incorrect	P187F	Detects error on ARC & PV reported by ECM about signal $1E4 from TRS on PT Sensor Bus from SIB (Shifter Buttons)	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage AND A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples Signal received in 25 ms message	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Secondary Signal Message Counter Incorrect	P188A	Detects error on ARC & PV reported by ECM about signal $2C2 from TRS on PT Exp Bus	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3 seconds for a time > 3,000 msec	8 failures out of 10 samples Signal received in 50 ms message.	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Circuit Stuck Off	P189D	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states	When either is “PRESSED” for 100 ms then pressed event is entered. Fault is incremented if other switch	 Is not pressed during event.	Not Fault Active Controller is on Park button switches Vehicle Speed	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd	7 synchronized failures in a row. *note: these samples can accumulate over key-cycles	DTC Type A, One trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Assistance System Performance	P18CB	Determines if Park assist active bit from EBCM is valid	Speed Error - APA active ($1C6/$1C7) above a vehicle speed threshold	> 10.00	Serial communication to EBTCM (U0108) Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = Traction Present	>= 6 failures out of 10 Performed every 12.5ms	Type C, No SVS
			OR Initialization Error - APA active ($1C6/$1C7) without an active torque request	APA active boolean transitions from False to True with Torque Intervention = No request			>= 6 failures out of 10 Performed every 12.5ms	
			OR Exit Error - APA transitions to inactive during active torque request above a vehicle speed threshold	APA active boolean transitions from True to False with Torque Intervention <> No request when vehicle speed is > 1.00			When transition occurs, no number of samples Performed every 12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "A" Circuit Correlation	P18CD	Compares Switch "A" with other relevant TRS Switches Switch "A" = Drive Input 1	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17E3, P17E4, P17E5	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "B" Circuit Correlation	P18CF	Compares Switch "B" with other relavent TRS Switches Switch "B" = Drive Input 2	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17E6, P17E7, P17E8	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "C" Circuit Correlation	P18D1	Compares Switch "C" with other relevant TRS Switches Switch "C" = Drive Input 3	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17E9, P17EA, P17EB	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "D" Circuit Correlation	P18D3	Compares Switch "D" with other relavent TRS Switches Switch "D" = Neutral Input 1	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17EC, P17ED, P17EE	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "E" Circuit Correlation	P18D5	Compares Switch "E" with other relevant TRS Switches Switch "E" = Neutral Input 2	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17EF, P17F0, P17F8	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "F" Circuit Correlation	P18D7	Compares Switch "F" with other relevant TRS Switches Switch "F" = Neutral Input 3	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17F9, P17FD, P17FE	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "G" Circuit Correlation	P18D9	Compares Switch "G" with other relavent TRS Switches Switch "G" = Reverse Input 1	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P1803, P1805, P1806	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "H" Circuit Correlation	P18DB	Compares Switch "H" with other relevant TRS Switches Switch "H" = Reverse Input 2	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P1807, P180C, P180D	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "J" Circuit Correlation	P18DD	Compares Switch "J" with other relevant TRS Switches Switch "J" = Reverse Input 3	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P180E, P180F, P1812	80 failures out of 100 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "L" Stuck On	P18E1	Detects TRC Switch "L" is stuck on. Switch "L" = Manual/ Low Input	Valid switch status "pressed" for a longer than expected time.		Not Fault Active	P186B, P186C, P186D	4,800 failures out of 6,000 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches A-B-C Stuck On	P18E9	Detects when TRS Switches A, B and C are stuck on A, B, C are Drive Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P17E3, P17E4, P17E5, P17E6, P17E7, P17E8, P17E9, P17EA, P17EB	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches D-E-F Stuck On	P18EA	Detects when TRS Switches D, E and F are stuck on D, E, F are Neutral Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P17EC, P17ED, P17EE, P17EF, P17F0, P17F8, P17F9, P17FD, P17FE	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches G-H-J Stuck On	P18EB	Detects when TRS Switches G, H and J are stuck on G, H, J are Reverse Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P1803, P1805, P1806, P1807, P180C, P180D, P186B, P186C, P186D	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor Circuit Low Voltage	P203C	This diagnosis verifies if an short to ground or open circuit occurred in the DEF level sensor	DEF level sensor raw signal is below a calibrated threshold	< 2.00	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN comunication	1.00 == TRUE > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	40.00 failures out of 50.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor Circuit High Voltage	P203D	This diagnosis verifies that the short to battery occurred in the DEF level sensor	DEF level sensor raw signal is above a calibrated threshold	> 95.00	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN comunication	1.00 == TRUE > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	40.00 failures out of 50.00 samples Time basis = 100ms	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Sensor Performance	P204B	This diagnosis verifies if the DEF tank Pressure sensor is affected by rationality fault (offset)	At the end of driving cycle, with DEF line empty and pressure compensation phase done, DEF pressure sensor signal is not equal (with tolerance) to the ambient pressure DEF Pressure signal outside the range:	(7.50 ; 18.50) [KPa]	Test enabled by calibration DEF dosing valve not in fault No electrical fault on pressure sensor SCR System Stand-By recovery action not activated No DEF Pump Rotor Stall fault No DEF Pressure Governor Deviation High fault DEF temperature sensor higher than a calibrated threshold End of trip process executed SCR pressure compensation performed during afterrun DEF metering valve HWIO interface provides INDETERMINATE OR NO-FAULT during After-Run state	1.00 SCR_DEFMV_FA == FALSE SCR_DEFPS_FA == FALSE SCR_DEFPM_FA == FALSE SCR_PresGovDvtnHiFA == FALSE > -7.00	160.00 failures out of 200.00 samples Time basis = 25ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Sensor Circuit Low Voltage	P204C	This diagnosis verifies that the DEF pressure sensor is affected by open circuit or short circuit to ground	The DEF pressure sensor raw signal is a voltage, expressed as percentage of the sensor's supply voltage. DEF pressure sensor raw signal is below a calibrated threshold	< 5.00 [%]	Test enabled by calibration Battery voltage > 11V Key on Engine is not cranking	1.00 == TRUE > 11.00 [V]	100.00 failures out of 125.00 samples Time basis = 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Sensor Circuit High Voltage	P204D	This diagnosis verifies that the DEF pressure sensor is affected by short circuit to battery	The DEF pressure sensor raw signal is a voltage, expressed as percentage of the sensor's supply voltage. DEF pressure sensor raw signal is above a calibrated threshold	> 98.00 [%]	Test enabled by calibration Battery voltage > 11V Key on Engine is not cranking	1.00 == TRUE > 11.00 [V]	100.00 failures out of 125.00 Time basis = 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Performance	P205B	This diagnosis verifies that the DEF tank temperature sensor is affected by rationality fault (gain or offset)	Difference between temperature sensor signal and system average temperature (provided by the Exhaust Gas Temperature sensors) is greater than a calibrated threshold	> 35.00	Test enabled by calibration Battery voltage Key on (OR engine running) No loss of CAN comunication Average exhaust gas temperature available or not available for a time Engine speed = 0 rpm No electrical fault on DEF temperature sensor Time elapsed since last key off Tank Refill is not detected DEF temperature sensor signal is not outside the DEF freezing temperature range (with tollerance). Test not performed in this driving cycle No electrical malfunction detected:	1.00 == TRUE > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) < 8 s SCR_DEFTS_FA == FALSE > 28,800.00 [(-90.00 - 1.00) ; (-90.00 + 1.00)] [°C] SCR_DEFTS_ElecHiErr, SCR_DEFTS_ElecLoErr	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	This diagnosis verifies that the DEF tank temperature sensor is affected by open circuit or short circuit to ground	The DEF tank temperature sensor raw output is a resistance expressed in [ohm] DEF temperature sensor raw signal is below a calibrated threshold	< 200.00 [ohm]	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication DEF Tank heater not in fault	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTH_FA == FALSE	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Circuit High Voltage	P205D	This diagnosis verifies that the DEF tank temperature sensor is affected by short circuit to battery	The DEF tank temperature sensor raw output is a resistance expressed in [ohm] DEF temperature sensor raw signal is above a calibrated threshold	> 60,000.00	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication DEF Tank heater not in fault Defrost phase is completed	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTH_FA== FALSE	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance (For use on vehicles with dual fuel tanks 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	1) == Disabled status 2a) ≥ 1,024.0 liters 2b) < 8.3 liters 2c) >= 19.9 liters	1a) Diagnostic Enabled 1b) Engine Operational Status	1a) == True 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	1) == Disabled status 2a) < 1,024 liters 2b) > 9 liters 2c) >= 3,630 seconds	1a) Diagnostic Enabled 1b) Engine Operational StatusEngine Running	1a) == True 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) >= 22 liters	1a) Diagnostic Enabled 1b) Engine Operational StatusEngine Running 2) Secondary tank volume [Not Empty] is	1a) == True 1b) == Running 2) ≥ 8.7 liters	250 ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with dual fuel tanks)	P2067	This DTC will detect a fuel sender stuck out-of-range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 % or 29.30 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples 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 Illum.
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with dual fuel tanks)	P2068	This DTC will detect a fuel level sensor stuck out-of-range high in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 % or 0.59 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples 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 Illum.
DEF Quality Sensor Performance	P206B	This diagnosis checks if the DEF Quality Sensor has performance problems	The Quality sensor ready flag is provided to the ECM by the DEF-C via CAN bus. This monitor checks if the reflected sound waves are not heard by the sensor (for example, if the sensor is contaminated).	Quality sensor ready flag status equals to FALSE	Run/Crank is Active Powertrain relay voltage Engine in Cranking Phase No loss of CAN communication No fault messages from the DEF-C Controller DEF Level Estimation DEF QS thermistor temperature No electrical fault on DEF QS is present No electrical low fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit No fault on DEF QS thermistor is present No electrical fault on Quality sensor PZT is present	TRUE > 11.00 V FALSE CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE > 4.00 l > 5.00 °C DQMR_DEFQS_ElecFlt == FALSE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE DQMR_DEFQS_TempFlt == FALSE DQMR_DEFQS_PZT_EleFlt == FALSE	Time counter: 3,000.00 fails out of 3,750.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Quality Sensor Circuit Low	P206C	This diagnosis verifies if DEF Quality Sensor read out of range low	The Reductant Quality Sensor PZT Input Voltage Low error status is provided to the ECM by the DEF-C via CAN bus. This monitor checks if the DEF-C Sensor read out of range low.	Reductant Quality Sensor PZT Input Voltage < 0.15 V (Input to Speed of Sound Signal Conditioning)	Run/Crank is Active Engine in Cranking Phase Powertrain relay voltage No loss of CAN communication No fault messages from the DEF-C Controller	TRUE FALSE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Quality Sensor Circuit High	P206D	This diagnosis verifies if DEF Quality Sensor sensor read out of range high	The Reductant Quality Sensor PZT Input Voltage High error status is provided to the ECM by the DEF-C via CAN bus. This monitor checks if the DEF-C Sensor read out of range high.	Reductant Quality Sensor PZT Input Voltage > 4.5 V (Input to Speed of Sound Signal Conditioning)	Run/Crank is Active Engine in Cranking Phase Powertrain relay voltage No loss of CAN communication No fault messages from the DEF-C Controller	TRUE FALSE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Control Circuit	P208A	This diagnosis verifies that the DEF pump phases are open	Motor Pump Phase Open Error status provided by DEF control module == FAULT		Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Motor Pump Phase Open Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	32.00 failures out of 40.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Control Circuit Low Voltage	P208C	This diagnosis verifies that the DEF pump phases are shorted to ground	Motor Pump Phase Shorted To Ground Error status provided by DEF control module == FAULT	VeSCRR_e_PmpMtrShrtToGND==FAULT	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Motor Pump Phase Shorted To Ground Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] (VeLVTR_b_PT_RelayInRange== TRUE) VePMDR_b_RunCrankActive==TRUE VeEMDR_b_EngModeCrank == FALSE U010E, Lost Communication With Reductant Control Module (SCR) (GetCANR_b_LostComm_FltN= FALSE) VeSCRR_e_PmpMtrShrtToGND != Indeterminate	20.00 failures out of 25.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Control Circuit High Voltage	P208D	This diagnosis verifies that the DEF pump phases are shorted to battery	Motor Pump Phase Shorted To Battery Error status provided by DEF control module == FAULT		Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Motor Pump Phase Shorted To Battery Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	20.00 failures out of 25.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit	P20B9	This diagnosis verifies if the DEF tank heater is affected by open circuit	Tank Heater Open circuit status == FAULT		Test enabled by calibration Temperature used by the heating strategy to switch on the heaters < threshold Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication DEF Temperature sensor not in fault Open circuit status provided by DEF control module different from indeterminate	1.00 < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTS_FA== FALSE	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit Low Voltage	P20BB	This diagnosis verifies if the DEF tank heater is affected by short circuit to ground	Tank Heater Short to Ground Low Side / High Side status == FAULT		Test enabled by calibration Temperature used by the heating strategy to switch on the heaters < threshold Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication DEF Temperature sensor not in fault Short to Ground Low Side / High Side status provided by DEF control module different from indeterminate	1.00 < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTS_FA== FALSE	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit High Voltage	P20BC	This diagnosis verifies if the DEF tank heater is affected by short circuit to battery	Tank Heater Short to Battery Low Side / High Side status == FAULT		Test enabled by calibration Temperature used by the heating strategy to switch on the heaters < threshold Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication DEF Temperature sensor not in fault Short to Battery Low Side / High Side status provided by DEF control module different from indeterminate	1.00 < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTS_FA== FALSE	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit	P20BD	This diagnosis verifies if the DEF line heater is affected by open circuit	Line Heater Open circuit status == FAULT		Test enabled by calibration Temperature used by the heating strategy to switch on the heaters < threshold Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Open circuit status provided by DEF control module different from indeterminate	1.00 < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit Low Voltage	P20BF	This diagnosis verifies if the DEF line heater is affected by short circuit to ground	Line Heater Short to Ground Low Side / High Side status == FAULT		Test enabled by calibration Temperature used by the heating strategy to switch on the heaters < threshold Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Short to Ground Low Side / High Side status provided by DEF control module different from indeterminate	1.00 < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit High Voltage	P20C0	This diagnosis verifies if the DEF line heater is affected by short circuit to battery	Line Heater Short to Battery Low Side / High Side status == FAULT		Test enabled by calibration Temperature used by the heating strategy to switch on the heaters < threshold Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Short to Battery Low Side / High Side status provided by DEF control module different from indeterminate	1.00 < 60.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Too Low	P20E8	This diagnosis verifies that the DEF pressure is lower than the target value set by the control	(Test 1) Too attemps of pressure build up (Test 2) DEF pressure setpoint - DEF measured pressure > calibrateable threshold	(Test 1) > 2.00 (Test 2) > 166.00	Test enabled by calibration Battery voltage Key on (OR engine running) Defrost complete Motor pump rotor stall fault not present No fault on DEF pressure sensor No fault on PWM command No electrical fault on DEF pump No electrical fault on DEF dosing valve Motor pump is no more green (some build pressure attempts already performed since the beginning of vehicle life). Time elapsed from the first build up attempt	1.00 > 11.00 [V] SCR_PmpRtrStlFA == FALSE SCR_DEFPS_FA== FALSE SCR_DEF_PumpCmdFA == FALSE SCR_DEFPM_FA == FALSE SCR_DEFMV_FA == FALSE > 1,200.00 [s]	40.00 failures out of 50.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(Test 1) Pressure Build-Up state is released for the first time during the driving cycle AND Test-Pass OR Test-Fail has not been reported for this test (Test 2) DEF pressure control is in pressure closed loop			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Too High	P20E9	This diagnosis verifies that the DEF pressure in the dosing line is too high	Difference between "DEF line pressure" and "DEF line pressure set point" > Threshold AND Pump rotor speed < Threshold	> 150.00 < 3,200.00	Test enabled by calibration Battery voltage Key on (OR engine running) DEF pressure sensor not in fault PWM_pump_command not in fault DEF pressure control status equal to “Closed loop control” DEF motor pump not in fault Pump motor speed signal valid on CAN	1.00 > 11.00 [V] SCR_DEFPS_FA== FALSE SCR_DEF_PumpCmdFA == FALSE VeSCRC_e_SCR_PresState == CeSCRC_e_PresCntrlCLC SCR_DEFPM_FA	200.00 failures out of 250.00 samples Time basis = 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SCR NOx Catalyst Efficiency Below Threshold Bank 1	P20EE	The diagnosis checks if there is a malfunction in the SCR NOx conversion system measuring its SCR NOx conversion efficiency. SCR NOx conversion efficiency is evaluated by two NOx sensors (upstream & downstream SCR). The monitoring is executed by comparing measured NOx conversion efficiency and expected NOx conversion efficiency: - Measured NOx conversion efficiency is calculated as η_Eff_Msrd = 1 - [∫ NOx_Dwn_Msrd / ∫ NOx_Up_Msrd] - Expected NOx conversion efficiency is evaluated as η_Eff_Ref = 1 - [∫ NOx_Dwn_Ref / ∫ NOx_Up_Msrd]	- If EWMA feature is not enabled (1 == 0 [Boolean]), measured SCR NOx conversion efficiency (η_Eff_Msrd) lower than expected one (η_Eff_Ref) - If EWMA feature is enabled (1 == 1 [Boolean]), EWMA filtering is applied to the difference between measured SCR NOx conversion efficiency (η_Eff_Msrd) and expected one (η_Eff_Ref)	- If EWMA filter is not enabled (1 == 0 [Boolean]) --> η_Eff_Ref - If EWMA filter is enabled (1 == 1 [Boolean]) --> Fail threshold is = 0, Repass threshold is = 0	Test enabled by calibration; No active DTCs; Debounce time elapsed after SCR chemical model is healed; Debounce time elapsed after exiting from transient dosing forced by remedial action (conditions active only if Market ≠ USA_CARB); Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is enabled and in Rapid Response (RR) or Fast Initial Response (FIR) state; Tests per trip up to calibratable value when EWMA filter is active and in Fast Initial Response (FIR) state;	CalOut = 1 [Boolean]; ≠ NOX_Snsr1_NOx_Flt ≠ NOX_NOx_SnsrSCR_DwnFlt ≠ EGT_TempSCR_UpFlt ≠ EGP_PresSCR_UpFlt ≠ EXM_TurbFlowNotValid ≠ SCR_RDP_Flt ≠ SCR_TipStuckFltSt ≠ SCR_ChemicalMdlFlt; Debounce = 300 [sec]; Debounce = 300 [sec]; NotDsbl = True [Boolean]; NotRun = True [Boolean]; FIR test trip < 1 ;	One failure to set the DTC.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Total tests executed in Fast Initial Response (FIR) state up to calibratable value when EWMA filtering is active;	FIR tot tests < 2 ;		
					Tests per trip up to calibratable value when EWMA filter is active and in Rapid Response (RR) state;	RR test trip < 2 ;		
					Total tests executed in Rapid Response (RR) state up to calibratable value when EWMA filtering is active;	RR tot tests < 4 ;		
					DEF system ready to inject;	DEF ready = True [Boolean];		
					Urea inside the tank not frozen;	DEF tank status = DEF_TankNotFrozen [Enumerative];		
					Debounce time elapsed after DEF defrost has been completed;	Debounce = 300 [sec];		
					Engine torque request higher than calibration;	Torque >= 0 [Nm];		
					Rate of change of estimated efficiency (from SCR catalyst model) less than or equal to a calibratable value;	|Rate of change of estimated efficiency| <= 1 [-]		
					Debounce time elapsed when estimated efficiency stable condition becomes	Debounce = 0 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					true;			
					Upstream SCR NOx sensor measurement reliable;	Reliable = True [Boolean];		
					Downstream SCR NOx sensor measurement reliable;	Reliable = True [Boolean];		
					Slip detection reliable;	Slip reliable = True [Boolean];		
					Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR catalyst de-greened);	DPF Rgn Compt > 1 [-];		
					SCR service bay test not active;	Service Bay Test == ServNotRunning [Enumerative];		
					Debounce time elapsed after exiting from SCR service bay test;	Debounce = 300 [sec];		
					Outside ambient temperature higher than calibration with hysteresis;	OAT > -7 [°C]; -7 [°C] < hysteresis range < -7 [°C]		
					Ambient pressure higher than calibration with hysteresis;	Pressure > 70 [kPa]; 70 [°C] < hysteresis range < 70 [°C]		
					Urea dosing activation by SCR mean temperature condition;	SCR mean temperature > 170 [°C]; 160 [°C] < hysteresis range < 170 [°C]		
					Debounce time elapsed	Debounce = 180 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					after urea dosing activation by SCR mean temperature becomes true;			
					Difference between SCR upstream and SCR downstream temperatures: - higher than first calibration curve (f[SCR mean temperature]) AND - lower than second calibration curve (f[SCR mean temperature]);	SCR up/down diff temperature > **T_MinTempGrad** [°C] Temperature < **T_MaxTempGrad** [°C];		
					Debounce time elapsed when difference between SCR upstream and SCR downstream temperature condition becomes in range;	Debounce = 1 [sec];		
					Exhaust mass flow and SCR average temperature within calibratable limits defined by 2 size table (f [exhaust mass flow, SCR average temperature]), enabled if table output is greater than calibration;	**K_EffExhFlowCond** > 1 [-];		
					Debounce time elapsed when exhaust mass flow and SCR average temperature conditions get within limits;	Debounce = 1 [sec];		
					SCR mean temperature	-5 < Delta temperature <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					time derivative within limits defined by maximum and minimum calibrations and debounce time elapsed based on following logic: - while SCR mean temperature time derivative is outside the limits, the system continuously evaluates the debounce time based on calibration curve (f[SCR mean temperature time derivative]) and records the maximum value; - instead when SCR mean temperature time derivative gets within the limits, countdown starts until debounce time has been reached;	5 [°C/sec]; Debounce = **t_DerTempDsblTmr** [sec];		
					Upstream SCR NOx flow measurement lower than calibration and debounce time elapsed based on following logic: - while SCR NOx flow measurement higher than calibration, the system continuously evaluates the NOx average flow; - instead when SCR NOx flow measurement gets lower than calibration, debounce time based on calibration curve (f[NOx average flow, time spent with NOx flow higher than calibration]) is	NOx up flow < 100 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max debounce = 5 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					evaluated and countdown starts until debounce time has been elapsed. Limitation on the debouce time is always applied;			
					Upstream SCR NOx flow measurement higher than calibration;	NOx up flow > 3 [mg/s];		
					Upstream SCR NOx sensor measurement higher than calibration;	NOx up > 400 [ppm];		
					Upstream SCR NOx sensor measurement lower than calibration;	NOx up < 1,000 [ppm];		
					Downstream SCR NOx sensor measurement higher than calibration;	NOx dwn > -1 [ppm];		
					Upstream SCR absolute NOx flow derivative lower than calibration;	Delta NOx up flow < 35 [mg/sec^2];		
					NO2/NO ratio: - higher than first calibratable value AND - lower than second calibratable value;	NO2/NO > 0 [-] NO2/NO < 1 [-];		
					Debounce time elapsed when all NOx conditions (except upstream SCR NOx flow measurement lower than calibration) become true;	Debounce = 0 [sec];		
					Slip conditions: - debounce time elapsed	Debounce = 60 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					when no slip is detected any more, OR - when slip is active NOx upstream flow accumulated shall be greater than a calibration curve (f[SCR temperature]);	∫ NOx_Up > **m_SlipNOxIntglThrsh** [mg];		
					DPF / DeHC combustion modes not active;	Cmb ≠ DPF_HiO2 | DPF_LoO2 | DPF_EngPrtct_HiO2 | DPF_EngPrtct_LoO2 | DPF_PN | DPF_RichIdle | DeHC_Drive | DeHC_Park [Enumerative];		
					Debounce time elapsed after exiting from DPF / DeHC combustion modes;	Debounce = 300 [sec];		
					NH3 storage deviation error: - higher than first calibration curve (f[SCR average temperature]) AND - lower than second calibration curve (f[SCR average temperature]);	NH3 deviation > **m_NH3_StrgDevErrMinThrsh** [g] NH3 deviation < **m_NH3_StrgDevErrMaxThrsh** [g];		
					NH3 storage: - higher than first calibration curve (f[SCR average temperature]) AND - lower than second calibration curve (f[SCR average temperature]);	NH3 storage > **m_NH3_StrgMinThrsh** [g] NH3 storage < **m_NH3_StrgMaxThrsh** [g];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Debounce time elapsed when NH3 storage deviation error or NH3 storage condition becomes in range; SCR dosing in NH3 storage control or in intrusive NH3 storage control; Debounce time elapsed when switching to NH3 storage control or intrusive NH3 storage control; Diesel Exhaust Fluid quality measurement (concentration read by DEF quality sensor) higher than calibration with hysteresis (condition active only if DEF quality sensor is available);	Debounce = 3 [sec]; Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 1 [sec]; DEF concentration > 29 [Pct]; 28 [Pct] < hysteresis range < 29 [Pct] DEFQS present= 1 [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< 0.4625 % 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 Illum.
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 >	4.7500 % 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 Illum.
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 <	0.3250 % 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 Illum.
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 >	2.6000 % 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 Illum.
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 Illum.
Reductant Pump A Current Too High	P214E	This diagnosis verifies that the DEF pump current flow is too high	Motor High Current Error status provided by DEF control module == FAULT OR Motor Current Limit Error status provided by DEF control module == FAULT		Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Motor High Current Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	20.00 failures out of 25.00 samples OR 20.00 failures out of 25.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects when the Intake Air Temperature (IAT) sensor and IAT2 sensor values do not correlate with each other. These two temperature sensors are both in the induction system, although they do have different sensor time constants and different positional relationships with components that produce heat. If these two temperature values differ by a large enough amount, the Intake Air Temperature 1 / 2 Correlation Diagnostic will fail. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time 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 Illum.
Barometric Pressure (BARO) Sensor Performance (3 intake air pressure sensor configuration)	P2227	This monitor is used to identify BARO sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If BARO sensor is not in agreement with the other two the monitor is able to pinpoint BARO as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 20.00 [mm^3] > 90.00 [%] > 60.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			BARO Pressure OR BARO Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 20.0 [kPa] > 20.0 [kPa] <= 20.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (Diesel, pull-down)	P2228	Detects a continuous short to ground or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 35.5 % of 5 Volt Range (This is equal to 50.0 kPa)			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 Illum.
Barometric Pressure (BARO) Sensor Circuit High (Diesel, pull-down)	P2229	Detects a continuous short to power in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 94.1 % of 5 Volt Range (This is equal to 115.1 kPa)			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 Illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO readings			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 Illum.
Turbocharger/ Supercharger Boost System A Performance (OBDII market only)	P2263	This monitor is used to detect any malfunction in the boost pressure control system causing very high or low intake manifold pressure that could lead to overspeed the turbine. It works only in steady state closed loop pressure control zone, tipically in the turbine overspeed area outside of the FTP test cycle. The DTC checks a positive or negative control deviation of the boost pressure indicating an underboost or overboost condition. The aim of the boost pressure system performance monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold (underboost) or obstructions in the exhaust pipe (overboost) that lead to overspeed the turbine.	Boost pressure tracking error: difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): (**P2263: Boost pressure system performance negative error threshold (throttle control active)** [kPa] x **P0234, P2263: Overboost barometric correction**) OR >(**P2263: Boost pressure system performance positive error threshold (throttle control active)** [kPa] x **P0299, P2263: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old (Engine Coolant Temperature	1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -9.00 [°C] AND < 80.00 [°C] > -5 [kPa/s] AND < 5 [kPa/s] > 60 [°C]	400.00 fail counters over 500.00 sample counters sampling time is 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				flags" Free Form): < (**P2263: Boost pressure system performance negative error threshold (throttle control not active)** [kPa] x **P0234, P2263: Overboost barometric correction**) OR > (**P2263: Boost pressure system performance positive error threshold (throttle control not active)** [kPa] x **P0299, P2263: Underboost barometric correction**)	OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature Ambient Air Pressure in range Throttle Valve position Engine speed in range Desired intake Boost pressure in range No active DTCs All enabling conditions last for a time	==TRUE < 124 [°C] > 75 [kPa] AND < 120 [kPa] >= 90.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 90.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form) > 2,250.00 [rpm] AND < 4,500.00 [rpm] > 200.00 [kPa] AND < 300.00 [kPa] AIC_BstSysDiagDenomDsbl ==FALSE >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P2263: Boost pressure system performance monitor delay timer [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Water in Fuel Sensor Circuit (Digital/ Passive, Wired to FTZM)	P2264	Monitor verifies that sensor reports 'water in fuel present' as self test within first seconds since it is supplied.	Water In Fuel sensor output	≥ 4.5 V (Water not present)	Powertrain relay voltage Ignition off time Ignition on time Software and Calibration versions match (refer to '*MEMR FNA Matched Flag*' free form) Sensor Bus Relay commanded on FTZM supply voltage No active DTC: No error for Engine Not Running timer	≥ 11.0 V > 28,800.0 s > 0.30 s and < 1.80 s ≥ 8.0 V P1103 SBR_RlyFA	10 failure out of 14 samples 100 ms/sample	Type C, SVS one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Inlet Pressure (TCIAP) Sensor Performance (3 intake air pressure sensor configuration)	P227B	This monitor is used to identify TCIAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running) If TCIAP sensor is not in agreement with the other two the monitor is able to pinpoint TCIAP as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crank relay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 20.00 [mm^3] > 90.00 [%] > 60.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		
			TCIAP Pressure OR TCIAP Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 20.0 [kPa] > 20.0 [kPa] <= 20.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor Circuit C Low (Diesel, pull-up)	P227C	Detects a continuous short to ground in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	< 39.4 % of 5 Volt Range (This is equal to 50.2 kPa)			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 Illum.
Barometric Pressure Sensor Circuit C High (Diesel, pull-up)	P227D	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	> 90.2 % of 5 Volt Range (This is equal to 115.4 kPa)			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 Illum.
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 12.5 milliseconds previous)	> 152 kPa 80 consecutive BARO C readings			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 Illum.
Fuel Pressure Regulator 1 - Forced Engine Shutdown	P228A	Determine when rail pressure is lower than desired setpoint and metering unit actuator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded fuel flow for metering unit	> 40 MPa ≥ Maximum flow deliverable by high pressure pump (refer to *RailPresCntrl* section)	Run crank voltage Engine running Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No DTC active since key is on:	≥ 11.0 V P000F	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 2 - Forced Engine Shutdown	P228B	Determine when rail pressure is lower than desired setpoint and rail pressure regulator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded pressure for pressure regulator valve	> 40 MPa ≥ 30 to 30 MPa (see table **P228B Pressure Regulator completely closed command**)	Run crank voltage Engine running Pressure Regulator controlled in closed loop (refer to *RailPresCntrl*)	≥ 11.0 V	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low	P228C	Determine when rail pressure is lower than desired setpoint.	Rail pressure setpoint - measured rail pressure	> 13 to 13 MPa (see table **P228C Positive rail pressure deviation (MU)**)	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (**P228C P228D Low fuel level calibrated as enabling condition (MU)** AND LowFuelConditionDiagnostic (**P228C P228D Air ambient pressure calibrated as enabling condition (MU)** AND Air ambient pressure (**P228C P228D Air ambient temperature calibrated as enabling condition (MU)** AND Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 0.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -22 °C) P000F	640 failures out of 800 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	> 13 to 13 MPa (see table	Run crank voltage Engine running Pressure Regulator	≥ 11.0 V	640 failures out of 800 samples 12.5 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P229A Positive rail pressure deviation (PR))	controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (**P229A P229B Low fuel level calibrated as enabling condition (PR)** AND LowFuelConditionDiagnostic (**P229A P229B Air ambient pressure calibrated as enabling condition (PR)** AND Air ambient pressure (**P229A P229B Air ambient temperature calibrated as enabling condition (PR)** AND Air ambient temperature	> 0.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -22 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High	P228D	Determine when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< -13 to -13 MPa (see table **P228D Negative rail pressure deviation (MU)**	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity Fuel temperature (**P228C P228D Low fuel level calibrated as enabling condition (MU)** AND LowFuelConditionDiagnostic (**P228C P228D Air ambient pressure calibrated as enabling condition (MU)** AND Air ambient pressure (**P228C P228D Air ambient temperature calibrated as enabling condition (MU)** AND Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 0.0 mm^3/stroke > -40 °C = FALSE) ≥ 60 kPa) ≥ -22 °C) P000F	640 failures out of 800 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	< -13 MPa	Run crank voltage Engine running	≥ 11.0 V	640 failures out of 800 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Pressure Regulator controlled in closed loop (refer to RailPresCntrl) Fuel injected quantity **P229A P229B Low fuel level calibrated as (enabling condition (PR)** AND LowFuelConditionDiagnostic (**P229A P229B Air ambient pressure calibrated as enabling condition (PR)** AND Air ambient pressure (**P229A P229B Air ambient temperature calibrated as enabling condition (PR)** AND Air ambient temperature	> 0.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -22 °C)	12.5 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 2 Performance	P2293	Determine when rail pressure is above maximum threshold when pressure is governed by Pressure Regulator valve.	Rail pressure	> 67 to 217 MPa (see table **P2293 Maximum rail pressure with PR**)	Run crank voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl*)	≥ 11.0 V	160 failures out of 229 samples OR 160 continuous failures out of 229 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 2 Control Circuit	P2294	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit: impedance between signal and controller ground	≥ 200 kΩ	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	≥ 11.0 V > 6.0 V	44 failures out of 88 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 Illum.
Fuel Pressure Regulator Solenoid 2 Control Circuit Low Voltage	P2295	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground: impedance between signal and controller ground	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	≥ 11.0 V > 6.0 V	44 failures out of 88 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 Illum.
Fuel Pressure Regulator Solenoid 2 Control Circuit High Voltage	P2296	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power: impedance between signal and controller power	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	≥ 11.0 V > 6.0 V	44 failures out of 88 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 Illum.
DEF tank heater supply undervoltage monitoring	P248A	This diagnosis verifies that the tank heater supply voltage is under the threshold of correct functioning	Tank heater supply under-voltage (System Battery voltage - Tank heater Supply Voltage value)	> 3.00	Test enabled by calibration Powertrain relay in range Run Crank Active Cranking phase excluded No SCR Power Module CAN loss of communication Heating strategy is requesting the Heater to be activated	1.00 U010E, Lost Communication With Reductant Control Module (SCR) VeSCRR_b_HeatA_On == TRUE	16.00 failures out of 20.00 samples Time basis = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF tank heater supply overvoltage monitoring	P248B	This diagnosis verifues that the tank heater supply voltage is over the threshold of correct functioning	Tank heater supply voltage - PT relay voltage	> 2.0 V	Run Crank in range PT relay voltage (Run Crank voltage OR Engine running) Engine not cranking Tank heater commanded on None of following DTC present:	≥ 11.0 V ≥ 11.0 V > 6.0 V U010E	16 failures out of 20 samples 500 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF line heater supply undervoltage monitoring	P248C	This diagnosis verifues that the line heater supply voltage is under the threshold of correct functioning	Line heater supply under-voltage (System Battery voltage - Line heater Supply Voltage value)	> 3.00	Test enabled by calibration Powertrain relay in range Run Crank Active Cranking phase excluded No SCR Power Module CAN loss of communication Heating strategy is requesting the Heater to be activated	1.00 U010E, Lost Communication With Reductant Control Module (SCR)	16.00 failures out of 20.00 samples Time basis = 500ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF line heater supply overvoltage monitoring	P248D	This diagnosis verifues that the line heater supply voltage is over the threshold of correct functioning	Line heater supply voltage - PT relay voltage	> 2.0 V	Run Crank in range PT relay voltage (Run Crank voltage OR Engine running) Engine not cranking Tank heater commanded on None of following DTC present:	≥ 11.0 V ≥ 11.0 V > 6.0 V U010E	16 failures out of 20 samples 500 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249D	This diagnosis checks if the DEF injection system has exceeded the limit of correction authority. The monitoring is executed by comparing the long-term adaptation factor (LTAF) with a calibratable threshold: LTAF > OBD high threshold. The long-term adaptation factor is calculated based on the information given by the NH3 storage correction strategy. This factor represents the measured deviation of the complete SCR system and shall be used to compensate it by making a correction over the DEF injection quantity.	Long-term adaptation factor (LTAF) higher than calibratable threshold	LTAF > 1.98	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Reductant Injection Control At Limit - Flow Too High	P249E	This diagnosis checks if the DEF injection system has exceeded the limit of correction authority. The monitoring is executed by comparing the long-term adaptation factor (LTAF) with a calibratable threshold: LTAF < OBD low threshold. The long-term adaptation factor is calculated based on the information given by the NH3 storage correction strategy. This factor represents the measured deviation of the complete SCR system and shall be used to compensate it by making a correction over the DEF injection quantity.	Long-term adaptation factor (LTAF) lower than calibratable threshold	LTAF < 0.40	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Accessory Position Circuit Low (EREV/ PHEV only)	P2537	Detects a low ignition switch accessory position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the propulsion system has been active for a calibrated duration.	The ECM detects that the state of the accessory line is low when it should be high. The diagnostic is evaluated when Propulsion System Active time is > 5.0 seconds. Diagnostic fails when pass counts are	< 8 counts.			12.5 ms / sample Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	Message <> two's complement of message	Diagnostic Status	Enabled	>= 16 failures out of 20 samples.	Type B, 2 Trips
					Power Mode	= Run	Performed on every received message	
			OR Rolling count error - Serial Communication message ($189/$199) rolling count index value	Message <> previous message rolling count value + one	Ignition Voltage	> 6.41 volts	>= 6 Rolling count errors out of 10 samples.	
					Engine Running	= True	Performed on every received message	
			OR		Run/Crank Active	> 0.50 Sec	>= 6 range errors out of 10 samples.	
			Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase	> 330 Nm	No Serial communication loss to TCM (U0101)	No loss of communication	Performed on every received message	
			OR				>= 3 multi-transitions out of 5 samples. Performed every 200 msec	
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch position is in an invalid position. Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the hood switch reading is invalid in these ranges With a discrete type switch the hood switch reading is invalid when With a percentage type switch the hood switch reading is invalid in these ranges With a resistance type switch the hood switch reading is invalid in these ranges	 1281 Ohms to 1404 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) 71.60 % to 67.90 % or 45.80 % to 43.50 % or 17.30 % to 14.70 % 6,775.10 Ohms to 2,350.10 Ohms or 2,280.10 Ohms to 750.10 Ohms or 720.10 Ohms to 300.10 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 1 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	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 Illum.
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 outside an expected bounds for Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the bound is hood switch reading With a discrete type switch the bounds are With a percentage type switch the bound is hood switch reading With a resistance type switch the bound is hood switch reading	 <= 325 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) <= 14.70 % <= 300.10 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 1 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	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 Illum.
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 outside an expected bounds for Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the bound is hood switch reading With a discrete type switch the bounds are With a percentage type switch the bound is hood switch reading With a resistance type switch the bound is hood switch reading	 >= 3620 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) >= 71.60 % >= 6,775.10 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 1 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	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 Illum.
Piston Cooling Oil Control Circuit Open (Diesel only)	P25A9	Controller specific output driver circuit diagnoses the oil piston cooling jet 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 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset	1.00 >= 11.00 = True = False = False	>= 40.00 errors out of 50.00 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 Illum.
Piston Cooling Oil Control Circuit Low (Diesel only)	P25AA	Controller specific output driver circuit diagnoses the oil piston cooling jet 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 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset	1.00 >= 11.00 = True = False = False	>= 40.00 errors out of 50.00 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 Illum.
Piston Cooling Oil Control Circuit High (Diesel only)	P25AB	Controller specific output driver circuit diagnoses the oil piston cooling jet 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 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset	1.00 >= 11.00 = True = False = False	>= 40.00 errors out of 50.00 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 Illum.
Piston Cooling Oil Control Circuit Performance /Stuck Off (Diesel only)	P25AC	Diagnoses if the Oil Piston Cooling Jet is stuck off if it's commanded to be on.	Fail from passing state: Piston cooling jet oil pressure switch state when the piston cooling jet is commanded to be closed	= False	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset Engine Movement Engine Oil Pressure No active DTC's for diagnsotic enable: No TFTKO: The amount of time of valve is commanded to close	1.00 >= 11.00 = True = False = False = True >= 206.00 Fault bundles: EngOilPressureSensorFA PistonCoolingCktFA PistonCoolingFA PistonCoolingStuckClosed PistonCoolingStuckClosed >= 8.00	>= 40.00 errros out of 50.00 samples.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Piston Cooling Oil Control Circuit Stuck On (Diesel only)	P25AD	Diagnoses if the Oil Piston Cooling Jet is stuck on if it's commanded to be off.	Fail from passing state: Piston cooling jet oil pressure switch state when the piston cooling jet is commanded to be open	= True	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset Engine Movement Engine Oil Pressure No active DTC's for diagnsotic enable: No TFTKO: The amount of time of valve is commanded to close	1.00 >= 11.00 = True = False = False = True >= 206.00 Fault bundles: EngOilPressureSensorFA PistonCoolingCktFA PistonCoolingFA PistonCoolingStuckOpen PistonCoolingStuckOpen >= 3.00	>= 40.00 errors out of 50.00 samples.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unmetered Fuel - Forced Engine Shutdown	P25BD	Determines if engine overspeed condition is occuring when no fuel is being delivered	Engine Speed exceeds a threshold for a period of time	Fail Condition: Engine Speed > 5,200 RPM		Engine Speed > 1,500 RPM	Fail threshold: Overspeed condition TRUE > 499.0 milliseconds	Type A, 1 Trips
			Engine Speed less than a threshold for a period of time	Pass Condition: Engine Speed < (5,200 - 500) RPM		Engine Speed > 1,500 RPM	Pass threshold: Overspeed condition FALSE > 499.0 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
Fuel Pump "A" Low Flow / Performance	P2635	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	<= Low Threshold [Supporting Table] **P2635 Threshold Low** OR >= High Threshold [Supporting Table] **P2635 Threshold High**	a) Diagnostic enabled [FDBR_b_FSRD] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [HCIR_b_GshtFA DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds [FDBR_b_UseCalcFSRD_FltThrshs] c8) Engine Speed Status Valid c9) FAB_FuelPmpCktFA c10) Fuel Control Enable	a) == TRUE b) >= 40.00 seconds c1) == TRUE c2) <> TRUE c3) <> TRUE c4) <> TRUE c5) <> TRUE c6) <> TRUE c7) <> TRUE c8] == TRUE c9] <> TRUE c10) <> TRUE	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 Illum.
					Fault Active [DTC P12A6]			
					c11) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c11) <> TRUE		
					c12) Fuel Pump Speed Fault Active [DTC P129F]	c12) <> TRUE		
					c13) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_Info1_UcodeCmFA DTC P165C]	c13) <> TRUE		
					c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	c14] <> TRUE		
					c15) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c15) == CeFDBR_e_WiredTo_FTZM		
					c16) Sensor Bus Relay On	c16) == TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == NORMAL		
					g) Run_Crank input circuit voltage	g) 11.00 volts <= Run_Crank_V <= 32.00 volts		
					h) High Pres Fuel Pump	h) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Mode Management Enabled			
					j) High Pres Fuel Pump Control Mode	j) <> Disabled Mode AND a8b) <> ZeroFlow Mode		
					k) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]	k) 0.05 grams/sec <= InstFuelFlow <= Max Allowed Flow [Supporting Table] **P2635 Max Fuel Flow**		
					m1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr DTC]	m1) <> TRUE		
					m2) CAN Sensor Bus message $0C3_Available	m2) == TRUE		
					m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	m3) <> TRUE		
					n) Timer - Diagnostic Enable	n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low	P263A	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controllers P0650 may also set (MIL Control Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Supply Heater Control Circuit/Open	P2687	Controller specific output driver circuit diagnoses the Fuel Supply Heater Control Relay low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit: impedance between signal and controller ground	≥ 200 kΩ	Powertrain relay voltage Run crank voltage Engine not cranking	≥ 11.0 V > 6.0 V	10 failures out of 20 samples 100ms/sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Supply Heater Control Circuit Low	P2688	Controller specific output driver circuit diagnoses the Fuel Supply Heater Control Relay low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground: impedance between signal and controller ground	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking	≥ 11.0 V > 6.0 V	10 failures out of 20 samples 100ms/sample	Type C, SVS one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Supply Heater Control Circuit High	P2689	Controller specific output driver circuit diagnoses the Fuel Supply Heater Control 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: impedance between signal and controller power	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking	≥ 11.0 V > 6.0 V	10 failures out of 20 samples 100ms/sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Chassis Control Module 1 Requested MIL Illumination	P26C8	Monitors the Chassis Contol Module 1 MIL request message to determine when the Chassis Control Module 1 has detected a MIL illuminating fault.	Chassis Control Module 1 Emissions-Related DTC set and module is requesting MIL	Chassis Control Module 1 Emissions-Related DTC set and module is requesting MIL		Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	= 1.00 0.00 RPM 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	= 1.00 0.00 RPM 6.41 volts	8 failures out of 10 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	= 1.00 0.00 RPM 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Temperature Offset Monitor	P2ADA	Determine when the DEF Quality Sensor Temperature Offset is not plausible	This monitor checks if the difference between Tref (the average temperature of all the temperature sensors in the exhaust) and the temperature meausured by the QS thermistor is bigger than a threshold. |Tref – QS thermistor temperature|	> 35.00 °C	Engine in Cranking Phase Powertrain relay voltage Run/Crank is Active Tref signal is available (usually calculated after 8 hours vehicle soak) DEF QS thermistor temperature signal not equals the DEF freezing temperature (with tolerance) Time elapsed since last key off No fault on engine mode-not-run timer Urea Refill is not detected No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF QS is present No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	FALSE > 11.00 V TRUE TRUE > (-90.00 + 1.00)°C OR < (-90.00 - 1.00)°C > 28,800.00 s EngineModeNotRunTimerError TRUE CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_ElecFlt == FALSE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on DEF QS thermistor is present	DQMR_DEFQS_TempFlt == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Temperature OOR Low	P2ADB	This diagnosis verifies if DEF Quality Temperature Sensor read out of range low	This monitor checks if the DEF Quality Temperature Sensor signal is out of lower range. DEF QS thermistor temperature value	< -55.00 °C	Engine in Cranking Phase Powertrain relay voltage Run/Crank is Active No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF QS is present No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit DEF QS thermistor temperature	FALSE > 11.00 V TRUE CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_ElecFlt == FALSE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE > -7.0 °C	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Temperature OOR High	P2ADC	This diagnosis verifies if DEF Quality Temperature Sensor read out of range high	This monitor checks if the DEF Quality Temperature Sensor signal is out of higher range. DEF QS thermistor temperature value	> 155.00 °C	Engine in Cranking Phase Powertrain relay voltage Run/Crank is Active No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF QS is present No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	FALSE > 11.00 V TRUE CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_ElecFlt == FALSE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Erratic Temperature	P2ADD	This diagnosis verifies if the DEF Quality Temperature Sensor signal dynamic is plausible.	This monitor checks if the dynamic behaviour of the DEF Quality Sensor signal is out of calibratable thresholds. QS thermistor raw value OR QS thermistor raw value	 > (1-α) * 155.00 °C + (Last good sample * α) - measurement error < (1-α) * -55.00 °C + (Last good sample * α) with: α = e^[-(amount of consecutive bad samples * 0.08)] measurement error as per **P2ADD_Measure_Error** supporting table	Powertrain relay voltage Run/Crank is Active Engine in Cranking Phase No electrical fault on DEF QS thermistor is present No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF QS is present No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	> 11.00 V TRUE FALSE DQMR_DEFQS_PZT_ElecFlt == FALSE CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_ElecFlt == FALSE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 100.00 fails out of 125.00 samples Task = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Delivery Performance - Hydrualic Monitoring	P2BAA	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery.	Measured DEF pressure drop after the injection has been performed is lower than the expected pressure drop. The expected pressure drop depends on the motorpump efficiency (that is estimated based on the average commanded duty cycle). Measured DEF pressure drop	< **P2BAA RDP Min Press Drop** table	Ambient Air Temperature Barometric Pressure DEF Injector Component Management Ready DEF Injector Cooling Request DPF Regeneration Active DEF Injector Temperature DEF Injector Temperature variation of DEF Injector temperature within a time period Integrated DEF Injected Mass Integrated DEF Injected Mass Integrated Upstream NOx Flow Upstream SCR Exhaust Flow DEF System Hydraulic System Shutoff No DEF Mass Flow less than calibratable mass for calibratable time DEF Tank Status	> -20.00 °C > 70.00 kPa == TRUE == FALSE == FALSE > 230.00 °C < 400.00 °C < 3.00 °C = 100ms * 100.00 > 18,000.00 mg < 10,000,000.00 mg >= 10,000.00 mg > 15.00 g/s == FALSE < 100.00 mg/s >= 100ms * 10.00 = NOT FROZEN	Function Task: 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault for Upstream DEF Injector Temperature No fault for Outside Air Temperature No fault for Upstream SCR Exhaust Flow No fault for Barometric Pressure No fault for Upstream NOx Sensor Concentration No fault for Vehicle Speed Sensor Vehicle Speed below calibratable threshold for calibratable time No DEF Metering Valve Tip Stuck Fault Engine Mode Fuel injection quantity request Engine speed	[OAT_PtEstFiltFA or OAT_OAT_SnsrNonEmissFA] EXF_TotExhSCR_UpFlt AAP_AmbientAirPresDfltd == FALSE VehicleSpeedSensor_FA <= 655,535.00 km/h >= 100ms * 30.00 SCR_TipStuckFltSt == RUNNING < 1,000.0 mm^3 0 < rpm < 10,000		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 Low Voltage	P3051	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 1	< 1 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 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 Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 Low Voltage	P3052	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 2	< 1 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 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 Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 High Voltage	P3053	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 1	> 28 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 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 Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 High Voltage	P3054	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 2	> 28 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 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 Illum.
DC/DC Converter Actuator Voltage 1 Performance	P3055	Detects DC/DC Converter Actuator Voltage 1 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine running OR Engine stopped Battery Voltage	TRUE TRUE 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 a 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	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking Battery Voltage	TRUE TRUE for > 0 loops in 6.25 ms loop >= 6.60 Volts	16 failed samples out of 32 samples in a 6.25 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE has occurred	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 Illum.
DC/DC Converter Actuator Voltage 2 Performance	P3056	Detects DC/DC Converter Actuator Voltage 2 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine running OR Engine stopped Battery Voltage	TRUE TRUE 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 a 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	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking Battery Voltage	TRUE TRUE for > 0 loops in 6.25 ms loop >= 6.60 Volts	16 failed samples out of 32 samples in a 6.25 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE has occurred	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 Illum.
DC/DC Converter Ignition Switch Run/ Start Position Ciruit High Voltage	P305B	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit high faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory Battery Voltage	TRUE FALSE TRUE >= 6.60 Volts	320 failed samples out of 400 samples in a 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 Illum.
DC/DC Converter Ignition Switch Run/ Start Position Ciruit Low Voltage	P305C	Diagnoses the DC/DC Converter Switch Run/ Start Position circuit for circuit low faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory Battery Voltage	TRUE TRUE TRUE >= 6.60 Volts	640 failed samples out of 800 samples in a 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 Illum.
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 Run/Crank ECM Crank Control Battery Voltage	TRUE TRUE FALSE >= 6.60 Volts	640 failed samples out of 800 samples in a 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 Illum.
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 Run/Crank or Accessory ECM Crank Control Battery Voltage	TRUE TRUE TRUE >= 6.60 Volts	24 failed samples out of 32 samples in a 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 Illum.
NOx Sensor Signal Message Counter Incorrect Bank 1 Sensor 1	P30B4	This DTC monitors for an error in communication with the NOx Sensor Signal Bank 1 Sensor 1 Signals	Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Oxygen Engine Out Data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 1 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 2 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 3 over CAN bus is	 >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 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 Illum.
			incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Error Engine Out Data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 4 over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Signal Message Counter Incorrect Bank 1 Sensor 2	P30B5	This DTC monitors for an error in communication with the NOx Sensor Signal Bank 1 Sensor 2 Signals	Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Oxygen Post Catalyst Data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Data 1 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 2 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Data 3 Alive Rolling Count	 >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 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 Illum.
			over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Error Engine Out Data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Data 4 Alive Rolling Count over CAN bus is incorrect for out of total samples	 >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control System Torque Request Too High	P30D3	detects adaptive cruise control requesting high torque for too long	Cruise control axle torque request rate limiting is active for too long	fail if torque request is being rate limited continuously for greater than 409.59 seconds.	Cruise system type CeACZR_e_AdaptCruise Cntrl is adaptive cruise.	Cruise torque request rate limit is active.		Type B, 2 Trips "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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 Illum.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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 Illum.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus status	=off	Controller On Ignition	= True for 3,000 msec = Run/Crank OR = Accessory	1.0 second	DTC Type B, Two Trips.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for Message $0BD Message $0C7 Message $0F9 Message $189 Message $199 Message $19D Message $1AF Message $1F5 Message $4C9	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	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 Illum.
					U0101 TCM	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Reductant Control Module (SCR)	U010E	This DTC monitors for a loss of communication with the Reductant Control Module (SCR)	Message is not received from controller for Message $092 Message $4CC Message $4CD Message $4E5 Message $4E6 Message $4E7 Message $4E8 Message $4E9	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	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 Illum.
					U010E Reductant Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on LIN bus	Message is not received from controller for ECM has lost communication over the LIN bus with Battery Monitor Module for	>= 3 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 400.00 milliseconds =Run >= 11.00 Volts	Between 100ms and 175ms due to rate of LIN communication to Battery Monitor Module.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus with Shutter Module A	ECM has lost communication over the LIN bus with Device 0 / Shutter 1 for	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 400.00 milliseconds =Run >= 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 Illum.
Lost Communication With NOx Sensor A	U029D	This DTC monitors for a loss of communication with the NOx Sensor A	Message is not received from controller for Message $0B0 Message $0B1 Message $0B5 Message $0B7 Message $289 Message $293 Message $591	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 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 Illum.
					not active for U029D NOx Sensor A	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With NOx Sensor B (post catalyst NOx sensor)	U029E	This DTC monitors for a loss of communication with the NOx Sensor B	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0A4	≥ 10.00 seconds	U0074	Not Active on Current Key Cycle		
			Message $0B2	≥ 10.00 seconds	Normal CAN transmission on Bus B	Enabled		
			Message $0B6	≥ 10.00 seconds	Device Control	Not Active		
			Message $0B8	≥ 10.00 seconds	High Voltage Virtual Network Management	Not Active		
			Message $28B	≥ 10.00 seconds	Ignition Voltage Criteria:			
			Message $294	≥ 10.00 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
			Message $592	≥ 10.00 seconds	Power Mode	= run		
					Off Cycle Enable Criteria:			
					KeCAND_b_OffKeyCycle DiagEnbl	= 1 (1 indicates enabled)		
					Ignition Accessory Line and Battery Voltage	= Active > 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	> 0.4000 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U029E NOx Sensor B	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With PM Sensor (Diesel Particulate)	U02A3	This DTC monitors for a loss of communication with the PM Sensor (Diesel Particulate)	Message is not received from controller for Message $3A3 Message $3A5 Message $3A7 Message $3A9 Message $3AB Message $497	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U02A3	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds Not Active on Current Key	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 Illum.
					PM Sensor (Diesel Particulate)	Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Control Module LIN Bus 1	U1345	Detects that LIN serial data communication has been lost with the LIN Bus	Bus Status	= Off	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of communication with Default to Park Actuator	U135A	Detects when ECM/ CHCM Loses Communication with Default to Park	Gen 1 ETRS: DTP to CHCM: Message $34 Gen 2 ETRS: DTP to ECM: Message $05	=Undetected =Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	CHCM $34: 1.0 second ECM $05: 500 msec Also: 125msec - 500 msec for some other messages.	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With DC/ DC Converter Control Module on Bus B	U18A7	This DTC monitors for a loss of communication with the DC/DC Converter Control Module on Bus B	Message is not received from controller for Message $0A0 Message $1D2	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 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 Illum.
					not active for U18A7 DC/DC Converter Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Control Module on Powertrain Expansion CAN Bus	U18D1	Detects that CAN serial data communication has been lost with the TRCM PT Exp Bus	Message $3CD, $4D5, $1D3	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	U18D2	Detects that CAN serial data communication has been lost with the TRS PT Sensor Bus	TRS Buttons Message: $2F3, $4C4, $1E4, TRS Linear Shifter Messages: $2F3, $4C4, $1EC	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	U18D3	Detects that CAN serial data communication has been lost with the SIB PT Exp Bus	TRS Buttons Message: $2C2 TRS Linear Shifter Message: $2EC	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Ignition Switch Run/ Start Position Circuit Low	B2B0D	This DTC monitors for a CGM Ignition Switch Run/Start Position Circuit Low error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Ignition Switch Run/Start Position Circuit Low DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Ignition Switch Run/ Start Position Circuit High	B2B0E	This DTC monitors for a CGM Ignition Switch Run/Start Position Circuit High error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Ignition Switch Run/Start Position Circuit High DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Control Module Memory Failure	B2B12	This DTC monitors for a CGM Control Module Memory Failure error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Control Module Memory Failure DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Control Module Internal Performance Failure	B2B13	This DTC monitors for a CGM Control Module Internal Performance Failure error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Control Module Internal Performance Failure DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Performance (FTS wired to ECM)	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	Averaged for absolute difference between fuel temperature and reference temperature is and (see **P0181 Fuel Temperature Sensor Reference**)	< 20.00 °C >= 20.00 °C	Run crank voltage Run crank voltage Engine not cranking A time and is passed since engine movement is detected Engine soak time No error for Engine Not Running timer No DTC active: (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "*OBD Coolant Enable Criteria*" section))	> 6.0 V ≥ 11.0 V > 8 s < 9.00 s > 28,799 s FTS_FTS_CktFA FTS_PlausRefSnsrFlt > -40 °C = TRUE	5 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 Illum.
Fuel Temperature Sensor A Circuit Low (FTS wired to ECM)	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	< 50 Ω	Run crank voltage Run crank voltage Engine not cranking	> 6.0 V ≥ 11.0 V	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit High (FTS wired to ECM)	P0183	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	> 121,865 Ω	Run crank voltage Run crank voltage Engine not cranking	> 6.0 V ≥ 11.0 V	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit Intermittent (FTS wired to ECM)	P0184	Determine when fuel temperature sensor changes quicker than expected, likely due to an intermittent fault.	Fuel temperature	> (1 - α) * 156 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage No active DTC:	> 6.0 V ≥ 11.0 V FTS_FTS_CktFA	10 failures out of 15 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	< (1 - α) * -56 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage No active DTC:	> 6.0 V ≥ 11.0 V FTS_FTS_CktFA	10 failures out of 15 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Low [FPPM applications only]	P0231	This DTC detects if the fuel pump control circuit is shorted to low. Per "smart device" design guidelines, Fuel Pump Power Driver device reports a Faulted state enumeration if current >= 18A [25A for high performance variants. FPDCM reports Not Faulted enumeration if current < 18A FPDCM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Power driver output current (Fuel Pump Power Module Driver Circuit Ground Short enumeration)	Current >= 18.0 A	a) Diagnostic Enabled b) Fuel Pump Control Enable command c) Fuel Pump Control Enable time [FAFR FPPM GshtDlyThr] d) System Voltage e] FPDCM Driver Status Alive Rolling Count Sample Faulted f] Diagnostic feedback received	a) == TRUE b) == TRUE c) >= 40.00 seconds d) > 7.00 Volts e] <> TRUE f] == TRUE	64.00 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 Illum.
Fuel Pump Secondary Circuit High [FPPM applications only]	P0232	This DTC detects if the fuel pump control circuit is shorted to high voltage by measuring voltage offset relative to low state level of duty cycle pulse. Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if circuit voltage >= 4V. FPPM reports Not Faulted enumeration if circuit voltage < 4V. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Voltage offset relative to low state level of duty cycle pulse measured at fuel pump circuit	> 4.0 V	a) Diagnostic Enabled b) Diagnostic System Disabled c) Fuel Pump Control Enabled d] Arbitrated Fuel Pump Duty Cycle Rate of Change [FCBR] e] System voltage f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic serial data received	a) == TRUE b) <> True c) == TRUE d] >= -100.0 % / sec e] > 7.0 volts f] <> True g] == TRUE	64 failures / 80 samples 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 Illum.
Fuel Pump Secondary Circuit Open [FPPM applications only]	P023F	This DTC detects if the fuel pump control circuit is open Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if current <= 1A . FPPM reports Not Faulted enumeration if current > 1A. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Output driver current (Fuel Pump Power Module Driver Circuit Open enumeration)	Current <= 1.0 A	a) Diagnostic Enabled b) Arbitrated Fuel Pump Duty Cycle (%) c] Fuel Pump Control Enable Faulted d] FPPM Fuel Pmp Driver Over-temperature Faulted e] FPPM Driver Status Alive Rolling Count Sample Faulted f] Diagnostic feedback received g] System Voltage	a) == TRUE b) > 37.27 % c] <> TRUE d] <> TRUE e] <> TRUE f] == TRUE g] > 11.00 Volts	40 failures / 80 samples 1 sample/12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	a) Sensed fuel volume change is b) while engine fuel consumption is	a) < 10 liters b) >= 35.00 liters	1. Diagnostic Enabled 2. Engine Operational State	1. == True 2. == Running	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Signal Message Counter Incorrect [FPPM applications only]	P129E	To detect if the command message received as serial data from the engine control module is valid The "rolling count check" value is created by adding an appended hexadecimal calculation to the pump duty cycle command value. In order to achieve a desired fuel pressure, a hexadecimal equivalent value representing the necessary fuel pump current pulse "On" time (duty cycle as a percent value) is transmitted to the FPPM. The corresponding "check" value is transmitted as well. At the FPPM, the received duty cycle command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported	FPPM Received Duty Cycle Rolling Count	<> Transmitted Duty Cycle Rolling Count (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Control Rolling Count Faulted d) FPPM Diagnostic data received [$0CE] e) FPPM Diagnostic Data Validity Enabled f) Diagnostic System Disabled g) Communication Faulted h) Run_Crank Ignition Switch Position Circuit Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e) == TRUE f) <> True g) <> True h) > 7.00 Volts j) == TRUE k) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Received Duty Cycle Protection Value	<> Transmitted Duty Cycle Protection Value (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Control Rolling Count Faulted d) FPPM Diagnostic data received [$0CE] e) FPPM Diagnostic Data Validity Enabled f) Diagnostic System Disabled g) Communication Faulted h) Run_Crank Ignition Switch Position Circuit	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e) == TRUE f) <> True g) <> True h) > 7.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		forward to the ECM where X/Y diagnostic counting is performed.			Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	 j) == TRUE k) == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Status Signal Message Counter Incorrect [FPPM applications only]	P12A8	To detect if the control status message transmitted as serial data from the driver control module is valid. The "rolling count check" value is created by adding an appended hexadecimal calculation to each control command value. The corresponding "check" value is transmitted to the FPPM as well as the actual command. At the FPPM, the received command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported forward to the ECM where X/Y diagnostic counting is performed.	FPPM Control Status Alive Rolling Count	<> ECM Control Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Power Consumption Alive Rolling Count	<> ECM Power Consumption Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Driver Status Alive Rolling Count	<> ECM Driver Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Hardware Status Alive Rolling Count	<> ECM Hardware Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Signal Message Counter Incorrect	P188B	This DTC monitors for an error in communication with the Transmission Range Signal	Communication of the Alive Rolling Count or Protection Value of the Transmission Range Signal Signal over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is avaialble >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 250ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor Stuck	P21C5	This diagnosis verifies that the DEF level sensor signal is stuck in range	Vehicle Speed >= calibrateable threshold AND Current Level sensor raw signal sample == Previous Level sensor raw signal sample	>= 2,000.00 [Km/h]	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking DEF temperature sensor not in fault DEF temperature higher than a calibrated threshold No loss of CAN comunication DEF level sensor not blocked by frozen DEF No electrical faults on DEF level sensor Vehicle speed is greater than a calibrateable threshold	0.00 == TRUE > 11.00 [V] SCR_DEFTS_FA== FALSE > -99.00 U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFLS_ElecFltSt == FALSE > 2,000.00	101.00 failures out of 100.00 samples Time basis = 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DEF level sensor measurement is in valid range IF the raw value of level sensor provides a signal such that the tank can be considered FULL , THEN the following condition shall be considered in AND with the Common conditions: - The number of tank level estimation corrections is greater than a calibrateable threshold IF the raw value of level sensor provides a signal such that the tank can be considered EMPTY (WARNING 2), THEN the following conditionS shall be considered in AND with the Common conditions: - The pressure governor deviation monitor is not reporting fault - The amount of DEF injected, since the level signal value is “1” EMPTY, is greater than a calibrateable threshold	> 0.00 > 9,999.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Water in Fuel Sensor Circuit (Digital/ Passive, Wired to ECM)	P2264	Monitor verifies that sensor reports 'water in fuel present' as self test within first seconds since it is supplied.	Water In Fuel sensor output	≥ 4.5 V (Water not present)	Powertrain relay voltage Ignition off time Ignition on time Software and Calibration versions match (refer to '*MEMR FNA Matched Flag*' free form) No error for Engine Not Running timer	≥ 11.0 V > 60.0 s > 0.30 s and < 2.50 s	10 failure out of 14 samples 100 ms/sample	Type C, SVS one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Sensor B Circuit Low	P2802	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a short to ground failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates short to ground failure Controller specific 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 monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean ≥ 9.00 volts ≤ 8.79 % ≥ 8.79 % CeTRGD_e_VoltDirctProp	fail time ≥ 0.50 seconds out of sample time ≥ 1.00 seconds battery voltage timer ≥ 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Sensor B Circuit High	P2803	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a power 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 or power short failure Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit or power short	≤ 0.5 Ω impedance between signal and controller voltage source OR ≥ 200 K Ω impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean ≥ 9.00 volts ≥ 91.21 % ≤ 91.21 % CeTRGD_e_VoltDirctProp	fail time ≥ 0.50 seconds out of sample time ≥ 1.00 seconds battery voltage timer ≥ 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A	Message is not received from controller for Message $3CF	≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	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 Illum.
					U0146 Gateway A	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Lost Communication with ECM	U18D5	This DTC monitors for a CGM Lost Communication with ECM error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Lost Communication with ECM DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module ECM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Lost Communication with TCM	U18D7	This DTC monitors for a CGM Lost Communication with TCM error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Lost Communication with TCM DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module TCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type X, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Central Gateway Module High Speed CAN Bus Off	U2413	This DTC monitors for a Central Gateway Module High Speed CAN Bus Off error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the Central Gateway Module High Speed CAN Bus Off DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Central Gateway Module Chassis Expansion CAN Bus Off	U2415	This DTC monitors for a Central Gateway Module Chassis Expansion CAN Bus Off error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the Central Gateway Module Chassis Expansion CAN Bus Off DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Lost Communication with ECM [FPPM applications only]	U2616	To detect lost serial data communication from the power driver controller to the ECM	Timer - Fuel System Control message not received (FPPM Received Data Communication Status)	t > 10 s (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) Diagnostic System Disabled condition d) FPPM Control Alive Rolling Count Faulted e) FPPM serial data received [$0CE] f) Run_Crank Input Circuit Voltage g) Run_Crank Ignition Switch Position status h) Sensor Bus Relay On	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) <> True e) == TRUE f) > 7.00 volts g) == TRUE h) == TRUE	64.00 failures / 80.00 samples 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 Illum.
Transmission Output Speed Sensor (TOSS)	P0502	The diagnostic monitor detects no activity in the TOSS circuit due to an electrical fault, wiring fault or sensor fault. The TOSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TOSS signal registers below a threshold, the DTC will set.	transmission output speed raw	≤ 60 RPM	service mode $04 active diagnostic monitor enable PTO active ignition voltage (controller run crank ignition in range) engine load enable occurs when: (accelerator pedal position engine torque) engine load disable occurs when: (accelerator pedal position engine torque OR accelerator pedal position engine torque) brake pedal position brake pedal position engine speed engine speed P0503 test fail this key on if clutch pedal is enabled clutch pedal position clutch pedal position P0502 test fail this key on OR P0502 fault active DTCs not fault active	= FALSE = 1 Boolean = FALSE ≥ 11.00 volts ≥ 20.0 % ≥ 100.0 Nm ≤ 6.0 % ≤ 80.0 Nm > 6.0 % ≤ 80.0 Nm ≤ 1.9 % < 80.0 % ≥ 6,500.0 RPM ≤ 1,500.0 RPM = FALSE = 1 Boolean ≥ 89.0 % > 84.0 % = FALSE = FALSE AcceleratorPedalFailure EngineTorqueEstInaccurate	fail time ≥ 0.5 seconds 100 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 Illum.
Transmission Output Speed Sensor (TOSS)	P0503	The diagnostic monitor detects an unrealistic drop in the TOSS signal due to a sudden electrical fault, wiring fault or sensor fault. The TOSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TOSS signal drops above a delta threshold, a fail timer is enabled. When a TOSS drop occurs it is possible to enable the P0502 fail time as well as the P0503 fail time. With both P0502 and P0503 fail timers active it is a race condition to either DTC.	ABS(raw transmssion output speed current loop - raw transmssion output speed previous loop), 25 millisecond update rate	≥ delta fail threshold RPM	service mode $04 active diagnostic monitor enable PTO active ignition voltage (controller run crank ignition in range)	= FALSE = 1 Boolean = FALSE ≥ 11.00 volts	fail time ≥ 3.250 seconds, increment fail count, fail count ≥ 5 counts, 25 millisecond update rate	Type A, 1 Trips
					4WD range current loop, update 4WD range time, reset 4WD range time when	≠ 4WD range previous loop	4wd range time ≥ 6.00 seconds	
					4WD range current loop	≠ 4WD range previous loop		
					raw transmission output speed OR	≥ 300.0 RPM	transmission output speed active time ≥ 2.00 seconds	
					last valid transmision output speed before delta drop, update transmission output speed active time	≥ 300.0 RPM		
					25 millisecond loop to loop transmision output speed positive delta, update transmission output speed stable time	≤ 150.0 RPM	transmission output speed stable time ≤ 2.000 seconds	
					P0503 fault active OR P0503 test fail this key on	= FALSE = FALSE		
					if shift lever position is enable: (shift lever position previous loop AND shift lever position current loop) OR shift lever position current	= 1 Boolean = NEUTRAL = IN GEAR = IN GEAR	shift lever position stablity time ≥ 0.500 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					loop, update shift lever position stablity time P0503 fault pending delta fail threshold P0503 fault pending clutch pedal position select delta fail threshold where mesaured ratio = TISS/TOSS: 1st gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 2nd gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 3rd gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 4th gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 5th gear mesaured ratio	 = TRUE = 900.0 RPM = FALSE ≥ 89.00 % ≥ 3.550 ≤ 4.090 = 900.0 RPM ≤ 3.550 ≥ 2.200 = 900.0 RPM ≥ 1.910 ≤ 2.200 = 900.0 RPM ≤ 1.910 ≥ 1.392 = 900.0 RPM ≥ 1.210 ≤ 1.392 = 900.0 RPM ≤ 1.210 ≥ 1.030 = 900.0 RPM ≥ 0.890 ≤ 1.030 = 1,200.0 RPM ≤ 0.890 ≥ 0.796 = 1,200.0 RPM ≥ 0.690		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 6th gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 7th gear mesaured ratio mesaured ratio delta fail threshold, otherwise delta fail threshold P0503 fault pending clutch pedal position delta fail threshold	≤ 0.796 = 1,200.0 RPM ≤ 0.690 ≥ 0.660 = 1,200.0 RPM ≥ 0.570 ≤ 0.660 = 1,500.0 RPM ≤ 0.570 ≥ 0.514 = 1,500.0 RPM ≥ 0.446 ≤ 0.514 = 2,000.0 RPM = 8,192.0 RPM = FALSE ≤ 84.00 % = 8,192.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit Open (Conventional)	P0615	Controller specific output driver circuit diagnoses the Starter relay (Conventional) high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	 >= 200 KOhms impedance between signal and controller ground.	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 0.00 RPM 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit Low Voltage (Conventional)	P0616	Controller specific output driver circuit diagnoses the Starter relay (Conventional) high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 0.5 Ohms impedance between signal and controller ground	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 0.00 RPM 6.41 volts	8 failures out of 10 samples 50 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit High Voltage (Conventional)	P0617	Controller specific output driver circuit diagnoses the Starter Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 0.00 RPM 6.41 volts	40 failures out of 50 samples 50 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Range / Performance	P08A8	A Clutch Pedal position sensor range fault is detected, if Clutch Pedal Position Sensor is in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that the ratio of engine RPM versus Transmission Output Speed (N/TOS) represents a valid gear. When this occurs a clutch pedal position error is measured and processed by a 1st order lag filter. When this clutch pedal position error exceeds the defined threshold, this fault code is set.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 4 %	N/TOS Ratio: Transfer Case: Vehicle speed: Engine Torque: Clutch Pedal Position: OR No Active DTCs:	Must match actual gear (i.e. vehicle in gear) Not in 4WD Low range > 6.2 MPH > **P08A8 EngTorqueThreshold Table** (see Supporting Tables) < **P08A8 ResidualErrEnableLow Table** (see Supporting Tables) > **P08A8 ResidualErrEnableHigh Table** (see Supporting Tables) ClutchPstnSnsrCktHi FA ClutchPstnSnsrCktLo FA CrankSensor_FA Transmission Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA	12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Low	P08A9	A continuous circuit Out-of-Range Low or open fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is below the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 10.0 Volts	400 counts out of 500 samples 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit High	P08AA	A continuous circuit Out-of-Range High fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is above the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 10.0 Volts	400 counts out of 500 samples 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Not Learned	P08AC	During final assembly at the manufacturing facility an initial Clutch Pedal Applied Learn is established. This Learn is used to understand the variation in the clutch fully applied position vs. the clutch pedal position. This position is then adjusted over time based on a learning algorithm in the engine controller to adjust for clutch physical wear with usage. This Diagnostic is used to detect when this Applied Learn value is outside of defined range based on the thresholds set by the diagnostic. If the Applied Learn value is outside of the range of the threshold values this fault code is set. The OBD Manufacturer's enable counter is utilized to prevent the MIL from setting during the vehicle assembly before a Position lean can be completed in the manufacturing facility.	Fully Applied Learn Position OR	< 12.0 % > 35.0 %	OBD Manufacturer's Enable Counter	= 0	250 ms loop Continuous	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position Exceeded Learning Limit (VGT Vacuum)	P003A	This monitor checks if the VGT position analog sensor has an offset with respect to the nominal positions where the valve does the learning procedure (fully closed and/or fully open)	analog position raw voltage when the valve is in fully closed position < low threshold OR analog position raw voltage when the valve is in fully closed position > high threshold OR analog position raw voltage when the valve is in wide open position < low threshold OR analog position raw voltage when the valve is in wide open position > high threshold	< 75.40 [%5V] OR > 85.40 [%5V] OR < 15.00 [%5V] OR > 33.70 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: -engine coolant temperature in range; -ambient pressure in range; -battery voltage in range; - engine idle speed in range; - no faults present on coolant temperature sensor. No faults present on VGT position sensor, VGT valve, VGTposition deviation. Break pedal not pushed End Of Trip event has	== 1.00 >= 60.00 (°C) <= 150.00 (°C) >= 60.00 (Pa) <= 103.00 (Pa) >= 11.00 (V) <= 32.00 (V) >= 700.00 (rpm) <= 950.00 (rpm) ECT_Sensor_FA ==FALSE VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Control Circuit (VGT Vacuum)	P0045	This monitor checks if the vacuum VGT command is in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase Run Crank relay supply voltage in range Vanes are requested in a position different from fully open (defaulted position) Shared High Side driver driven closed HWIO error status different from INDETERMINATE status	== 0.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Performance (VGT Vacuum)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	|VGT Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 15.00 [%]	Test enabled by calibration System out of the cranking phase Run Crank relay supply voltage in range VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation) VGT position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor	== 1.00 > 11.00 [V] VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE > -30.00 [%/s] < 30.00 [%/s] for >= 1.00 [s] >= 60.00 [°C]	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Outside air temperature higher or equal to minimum threshold No faults present on outside air temperature sensor No mechanical stop soft approach in progress No anti-sticking procedure in progress	ECT_Sensor_FA ==FALSE >= -60.00 [°C] OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Control Circuit Low (VGT Vacuum)	P0047	This monitor checks if the vacuum VGT command is shorted to ground	Resistance to ground lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase Run Crank relay supply voltage in range Vanes are requested in a position different from fully open (defaulted position) Shared High Side driver driven closed HWIO error status different from INDETERMINATE status	== 0.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Control Circuit High (VGT Vacuum)	P0048	This monitor checks if the vacuum VGT command is shorted to power supply	Resistance to supply lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase Run Crank relay supply voltage in range Vanes are requested in a position different from fully closed Shared High Side driver driven closed HWIO error status different from INDETERMINATE status	== 0.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Performance	P007B	This monitor checks if the CAC up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	> 20.00 [°C]	Test enabled by calibration	== 1.00	Test executed after a counter of 1.00 samples	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>= 0.10 [s]	Functional task: 100 ms	
					Runk Crank Relay voltage in range	> 11.00 [V]		
					The engine has not run for a calibratable time since last key off	>= 28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	< 45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler up air temperature sensors	CIT_CAC_UpCktFA ==FALSE CIT_CAC_UpSelfCorFA ==FALSE		
					No faults detected on intake manifold air temperature sensor	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Low	P007C	This monitor checks if the CAC up air temperature sensor is out of electrical range low	Charge air cooler up air temperature resistance value < low threshold	< 55.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit High	P007D	This monitor checks if the CAC up air temperature sensor is out of electrical range high	Charge air cooler up air temperature resistance value > high threshold	> 100,605.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -60.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_UpCktFA ==FALSE	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor Performance	P0101	This monitor checks if the MAF sensor measure is coherent with MAF estimation when the HP EGR and LP EGR (if present) are closed. It is able to detect MAF sensor wiring harness poor contacts, MAF sensor internal fault (offset), leaks from the induction air circuit, leaks from the recirculation exhuast gas circuit. For OBDII market, it is used to detect a PCV disconnection. The standard test can be calibrated to run when engine conditions are recognised as IDLE, OVERRUN or HIGH LOAD. An intrusive test can be enabled, to force the HP EGR to close when particular conditions are encountered, to allow the monitoring to run in idle.	Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflRaw ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 1.20 [ratio] < 0.80 [ratio]	Calibration on diagnostic enabling PT relay supply voltage in range Share High Side driver closed Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor OBDII Market: Outside Ambient Temperature in range OR Fault present on Ouside Air temperature EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature	**P0101: MAF performance enabling** ==TRUE > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVld ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE > -9.00 [°C] OAT_PtEstFiltFA==TRUE > -9.00 [°C] OAT_OAT_SnsrNonEmissFA ==FALSE	Test is evaluated after the enabling conditions are satisfied for a number of samples == 400.00 Sampling time is: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Induction air temperature	> -25.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60.00 [°C] ==TRUE < 124.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 74.00 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 85.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR valve position	<= 2.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR (if present) valve position	<= 0.00 [%]		
					No faults detected on LP EGR (if present) valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine works in IDLE, OVERRUN or HIGH LOAD condition	Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow	> 1.20 [ratio]	Intrusive Test enabled by calibration	1.00 ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples == 400.00 Sampling time is: 12.5 ms	
			Drift low check: drift of the mass air flow	< 0.80 [ratio]	MAF rationality monitoring enabled by calibration	**P0101: MAF performance enabling** ==TRUE		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflRaw		Diagnostic has not run in current driving cycle yet	==TRUE		
					Calibratable SCR dosing condition	IF 0.00 ==TRUE: SCR dosing condition is NH3 storage control OR intrusive NH3 storage control OR transient dosing control.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**			IF 0.00 ==FALSE: No restrictions on SCR dosing		
					SCR predicted NOx conversion efficiency	> -100.00 [ratio]		
					Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	< 8.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side driver closed	==TRUE		
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_Not Vld ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OBDII Market: Outside Ambient Temperature in range OR Fault present on Ouside Air temperature	> -9.00 [°C] OR OAT_PtEstFiltFA==TRUE		
					EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature	> -9.00 [°C] AND OAT_OAT_SnsrNonEmissFA ==FALSE		
					Induction air temperature	> -25.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60.00 [°C] ==TRUE < 124.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 74.00 [kPa]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 85.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					LP EGR (if present) valve position	<= 0.00 [%]		
					No faults detected on LP EGR (if present) valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine speed in range	> 750.00 [rpm] < 1,200.00 [rpm]		
					for a time	>= 1.00 [s]		
					Intake manifold pressure in range	> 74.00 [kPa] < 120.00 [kPa]		
					Intake manifold pressure is in steady state (SS)	when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, | Intake manifold pressure - p_ref| < 10.00 [kPa] for		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						maintaining the SS ON		
					Once all the conditions above are satisfied, additional conditions on HP EGR valve must be verified within a time limit	< 1.00 [s]		
					HP EGR valve position	<= 2.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					All conditions are verified for a time	> 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This monitor checks if the MAF sensor is out of electrical range low. The MAF sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	MAF frequency value	< 276.00 [Hz]	Test enabled by calibration Engine speed PT relay supply voltage in range Share High Side Driver closed All conditions are valid for a time	1.00 ==TRUE >= 50.00 [rpm] > 11.00 [V] ==TRUE >= 0.30 [s]	100.00 fail counts out of 125.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor Circuit High	P0103	This monitor checks if the MAF sensor is out of electrical range high. The MAF sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	MAF frequency value	> 12,500.00 [Hz]	Test enabled by calibration Engine speed PT relay supply voltage in range Share High Side Driver closed All conditions arevalid for a time	1.00 ==TRUE >= 50.00 [rpm] > 11.00 [V] ==TRUE >= 0.30 [s]	100.00 fail counts out of 125.00 sample counts Function task:100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Trim System Lean Bank 1	P0171	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its minimum value.	Released FSA fuel correction value	< refer to supporting table (**KtFADC_V_FSA_FuelMin**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.00 [s] > 72.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Trim System Rich Bank 1	P0172	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its maximum value.	Released FSA fuel correction value	> refer to supporting table (**KtFADC_V_FSA_FuelMax**)[mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.00 [s] > 72.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing Perfomance - Over Retarded	P01CB	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing Perfomance - Over Advanced	P01CC	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lower than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing Perfomance - Over Retarded	P01CD	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing Perfomance - Over Advanced	P01CE	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing Perfomance - Over Retarded	P01CF	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing Perfomance - Over Advanced	P01D0	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing Perfomance - Over Retarded	P01D1	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing Perfomance - Over Advanced	P01D2	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing Perfomance - Over Retarded	P01D3	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing Perfomance - Over Advanced	P01D4	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure LowFuelConditionDiagnostic Ambient temp FAD_XSQA_LrnCondEnbl No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] 1.00 = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing Perfomance - Over Retarded	P01D5	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing Perfomance - Over Advanced	P01D6	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing Perfomance - Over Retarded	P01D7	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing Perfomance - Over Advanced	P01D8	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure LowFuelConditionDiagnostic Ambient temp FAD_XSQA_LrnCondEnbl No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] 1.00 = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing Perfomance - Over Retarded	P01D9	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing Perfomance - Over Advanced	P01DA	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -90.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 74.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit	P0201	This DTC checks the Injector 1 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Injector 2 Open Circuit	P0202	This DTC checks the Injector 2 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 3 Open Circuit	P0203	This DTC checks the Injector 3 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 4 Open Circuit	P0204	This DTC checks the Injector 4 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Injector 5 Open Circuit	P0205	This DTC checks the Injector 5 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Injector 6 Open Circuit	P0206	This DTC checks the Injector 6 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Injector 7 Open Circuit	P0207	This DTC checks the Injector 7 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Injector 8 Open Circuit	P0208	This DTC checks the Injector 8 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Cylinder 1 Injection Timing	P020A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 1 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); - 	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing	P020B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 2 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); - 	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing	P020C	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 3 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderH and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing	P020D	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 4 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 4 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing	P020E	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 5 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing	P020F	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 6 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderG and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

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

Injection Timing Control Circuit	P0216	This DTC detects an ECU internal fault, by comparing the cumulative injection pulse width provided by HWIO and the cumulative injection pulse width calculated by Application SW.
		A calibration is used to define the pulses that have to be taken into account to calculate the cumulative injection pulse width, both by HWIO and by application SW.
		Two different thresholds are defined for detecting the fault. The high threshold depends on the number of injection pulses active, i.e. the injection pulses driven and monitored.
			The cumulative injection pulse width (both HWIO and Application SW) is calculated by considering only the pulses to be monitored, defined in the calibration **P0216_ET_CumulEnbl**
			
			if (Cumulative injection pulse width read by HWIO > Cumulative injection pulse width calculated by Application SW)
			{
			|Cumulative injection pulse width read by HWIO - Cumulative injection pulse width calculated by Application SW|
			}
			else
			{
			|Cumulative injection pulse width read by HWIO - Cumulative injection pulse width calculated by Application SW|
			}
			
			Cumulative injection pulse width calculated by Application SW is equal to the sum of the programmed pulses width and the end of injection period measurement
				> **P0216_PulsWidthErrHi** [us] depending on the number of injection pulses active
				
				> 32,767.00 [us]
					Test enabled by calibration;
					
					and
					Battery voltage
					
					and
					Key ON
					
					and
					No active DTC's:
					
					and
					At least one Injection Pulse is requested by the application software (FUL_FuelInjected
					
					and
					No information of dropped pulse reported by HWIO
						== 1.00 [Boolean]
						
						> 11.00 [V]
						
						-
						
						FUL_InjCktTFTKO
						FUL_CntrlrStTFTKO
						FUL_BoostVoltTFTKO
						FUL_PullInErrTFTKO
						
						== TRUE);
						
						-
							30 failures out of 124 samples
							
							or
							
							60 consecutive failures
							
							1 sample every cylinder firing
							
							Continuous
								Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing	P021A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 7 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 7 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing	P021B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 8 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 8 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Control Circuit Low Voltage	P0261	This DTC detects a short circuit to ground of the low side driver circuit of Injector 1.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 1 Control Circuit High Voltage	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 1 Maximum Authority Reached	P0263	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 1 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 1 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 1 saturated (positive or negative).	FAD_CB_Cyl_A_HiSaturated ==TRUE OR FAD_CB_Cyl_A_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fails Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 1 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Control Circuit Low Voltage	P0264	This DTC detects a short circuit to ground of the low side driver circuit of Injector 2.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 2 Control Circuit High Voltage	P0265	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 2.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 2 Maximum Authority Reached	P0266	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 2 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 2 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 2 saturated (positive or negative).	FAD_CB_Cyl_D_HiSaturated ==TRUE OR FAD_CB_Cyl_D_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 2 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit Low Voltage	P0267	This DTC detects a short circuit to ground of the low side driver circuit of Injector 3.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 3 Control Circuit High Voltage	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 3 Maximum Authority Reached	P0269	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 3 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 3 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 3 saturated (positive or negative).	FAD_CB_Cyl_B_HiSaturated ==TRUE OR FAD_CB_Cyl_B_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 3 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Efficiency Below Threshold (OBDII market only)	P026A	This monitor checks the Charge Air Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Reference temperature). Reference temperature can be selected via calibration: if 0.00 ==TRUE, it is the induction air temperature, otherwise it is the outside air temperature.	< 50.00 [%]	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet Vehicle speed in range Air mass flow in range Engine coolant temperature in range OR OBD Coolant Enable Criteria Throttle valve position Pressure ratio through the compressor in range Temperature difference between upstream charge air cooler and Reference temperature in range Environmental pressure in range Environmental temperature in range	1.00 ==TRUE ==TRUE > 60.00 [kph] > 10.00 [mg/s] < 100.00 [mg/s] > 60.00 [°C] ==TRUE > 90.00 [%] > 1.20 [ratio] > 10.00 [°C] > 74.80 [kPa] > -9.00 [°C]	Test executed after 900.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on throttle position sensor	TPS_PstnSnsrFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on Reference temperature sensor	OAT_PtEstFiltFA ==FALSE OR IAT_SensorFA==FALSE		
					No fault on charge air cooler upstream and downstream temperature sensors	CIT_CAC_UpFA==FALSE CIT_CAC_DwnFA ==FALSE		
					No fault on MAF meter	MAF_MAF_SnsrFA ==FALSE		
					No fault on Intake Manifold Pressure sensor	MAP_SensorFA==FALSE		
					All the enabling conditions last for a time	>= 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Quantity Lower Than Expected	P026C	An error shall be detected when the fuel adjustment value (mm3) released by FSA is below a calibrated threshold.	Released FSA fuel correction value lower than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp**) multiplied per ambient air pressure correction factor B	< A*B A = (If Group1 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_ECM_PresAmbWghtLo**)	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. Power Take-Off (PTO) is not active f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged for a time i. Engine speed in operating range	> 0.00 + 0.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 1.00 [s] > 72.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] different from Neutral or Parking > 0.50 [s] > 1,000 [rpm] < 2,400 [rpm]	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 40 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.25 [mm^3/25ms] > 0.50 [s]		
					m. Vehicle speed in operating range for a time	> 30 [kph] < 130 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_** (**CombModeGrp**)		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld Transmission Estimated Gear Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Quantity Higher Than Expected	P026D	An error shall be detected when the fuel adjustment value (mm^3) released by FSA is above a calibrated threshold.	Released FSA fuel correction value higher than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp**) multiplied per ambient air pressure correction factor B	> A*B A = (If Group1 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_ECM_PresAmbWghtHi**)	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. Power Take-Off (PTO) is not active f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged for a time i. Engine speed in	> 0.00 + 0.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 1.00 [s] > 72.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] different from Neutral or Parking > 0.50 [s] > 1,000 [rpm]	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					operating range	< 2,400 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 10 [mm^3] < 35 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.25 [mm^3/25ms] > 0.50 [s]		
					m. Vehicle speed in operating range for a time	> 30 [kph] < 130 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_** (**CombModeGrp**)		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld Transmission Estimated Gear Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Control Circuit Low Voltage	P0270	This DTC detects a short circuit to ground of the low side driver circuit of Injector 4.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 4 Control Circuit High Voltage	P0271	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 4.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 4 Maximum Authority Reached	P0272	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 4 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 4 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 4 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 4 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Control Circuit Low Voltage	P0273	This DTC detects a short circuit to ground of the low side driver circuit of Injector 5.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 5 Control Circuit High Voltage	P0274	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 5.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 5 Maximum Authority Reached	P0275	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 5 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 5 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 5 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 5 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit Low Voltage	P0276	This DTC detects a short circuit to ground of the low side driver circuit of Injector 6.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 6 Control Circuit High Voltage	P0277	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 6.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 6 Maximum Authority Reached	P0278	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 6 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 6 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 6 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 6 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Control Circuit Low Voltage	P0279	This DTC detects a short circuit to ground of the low side driver circuit of Injector 7.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 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 Illum.
Injector 7 Control Circuit High Voltage	P0280	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 7.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 7 Maximum Authority Reached	P0281	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 7 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 7 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 7 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 7 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Control Circuit Low Voltage	P0282	This DTC detects a short circuit to ground of the low side driver circuit of Injector 8.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 8 Control Circuit High Voltage	P0283	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 8.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder Balance 8 Maximum Authority Reached	P0284	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correction applied on cylinder 8 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 8 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 8 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 20.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Authority diagnosis that the Cylinder 8 is saturated. If this signal remains true for a debouncing time a DTC is stored.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Fuel Injector Offset Learning At Min Limit	P02CC	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. 1 Sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Fuel Injector Offset Learning At Max Limit	P02CD	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Fuel Injector Offset Learning At Min Limit	P02CE	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Fuel Injector Offset Learning At Max Limit	P02CF	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Fuel Injector Offset Learning At Min Limit	P02D0	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Fuel Injector Offset Learning At Max Limit	P02D1	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 3 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Fuel Injector Offset Learning At Min Limit	P02D2	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Fuel Injector Offset Learning At Max Limit	P02D3	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Fuel Injector Offset Learning At Min Limit	P02D4	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Fuel Injector Offset Learning At Max Limit	P02D5	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 5 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Fuel Injector Offset Learning At Min Limit	P02D6	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Fuel Injector Offset Learning At Max Limit	P02D7	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 6 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Fuel Injector Offset Learning At Min Limit	P02D8	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Fuel Injector Offset Learning At Max Limit	P02D9	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 7 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Fuel Injector Offset Learning At Min Limit	P02DA	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Fuel Injector Offset Learning At Max Limit	P02DB	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 8 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit	P02E0	This monitor checks if the Throttle commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from wide open (default position) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Performance	P02E1	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor	|Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 10.00 [%]	Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold No faults present on outside air temperature sensor	== 1.00 > 11.00 [V] >= 60.00 [°C] ECT_Sensor_FA ==FALSE >= -60.00 [°C] OAT_PtEstFiltFA ==FALSE	600.00 fail counts out of 750.00 sample counts 300.00 fail counts to enable the open circuit check (P02E0) Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Throttle position setpoint in steady state conditions for minimum time Throttle position closed loop control active No mechanical stop soft approach in progress No anti-sticking procedure in progress No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	> -10.00 [%/s] < 10.00 [%/s] for >= 1.00 [s] TPS_PstnShtOffReq == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Stuck Closed	P02E5	This monitor detects the Throttle valve mechanically stuck in a certain position different from its defaulted position (fully open) when the actuator is no longer driven (missing dafaulted position)	Measured Throttle position < minimum threshold	< 90.00 [%]	P02E1 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	> 2.00 [s] TPS_PstnShtOffReq == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit Low (SENT position sensor)	P02E8	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	< 5.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range and SENT performance	== 1.00 > 11.00 [V] TPS_SENT_OOR_Flt == FALSE TPS_SENT_PerfFlt == FALSE	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit High (SENT position sensor)	P02E9	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage > high threshold	> 95.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range and SENT performance	== 1.00 > 11.00 [V] TPS_SENT_OOR_Flt== FALSE TPS_SENT_PerfFlt== FALSE	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Current Range/ Performance	P02EB	This monitor checks if an excessive current flows through the Throttle DC-Motor (e.g. shunt circuit between load, Throttle DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle DC Motor current range/performance H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V] TPS_MtrCurrLimTFTKO == FALSE	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug/ Heater Indicator Control Circuit Low	P037A	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to ground.	Test performed by HWIO. A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance R to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The short to ground faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	R = 0.5 Ω	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True > 11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Ground short monitoring is implemented in HWIO which means no further debouncing is needed in case of short to ground	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug/ Heater Indicator Control Circuit High	P037B	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to high voltage.	Test performed by HWIO. A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance R to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R = 0.5 Ω	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True > 11.00 V == False	10.00 failures out of 20.00 samples Sampling rate: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug Sense Circuit Low	P037E	This DTC checks the circuit for electrical integrity during operation of glow plug sub-system. ECU internal fault.	Voltage feedback above threshold depending on system current and RunCrank relay voltage	battery_voltage - voltage_feedback > **KtGLOD_U_VoltLoDelMax (KnGLOD_I_GP_Curr)** [V]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_ON interface is true; No electrical fault detected on glow plugs; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeGLOO_b_GlowPlugEnbl = TRUE; VeGLOO_b_ElectFlt = FALSE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	60.00 fail samples over 120.00 samples Time task: 50 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug Sense Circuit High	P037F	This DTC checks the circuit for electrical integrity during operation of glow plug sub-system. ECU internal fault.	Voltage feedback over a threshold depending on RunCrank relay voltage	voltage_feedback > 5.00 [V]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_ON interface is true; No electrical fault detected on glow plugs; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeGLOO_b_GlowPlugEnbl = TRUE; VeGLOO_b_ElectFlt = FALSE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	40.00 fail samples over 80.00 samples Time task: 50 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug/ Heater Indicator Control Circuit/Open	P0381	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin open circuit.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance Ropendet and shall not be detected if the circuit impedance is less than the Ropmin. The open circuit faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	Ropendet = 300 Ω Ropmin = 10 Ω	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True > 11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Open load monitoring is implemented in HWIO which means no further debouncing is needed in case of open load	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Circuit	P0403	This monitor checks if the HP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from fully closed (default position) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Performance	P0404	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 10.00 [%]	Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold No faults present on outside air temperature sensor	== 1.00 > 11.00 [V] >= 60.00 [°C] ECT_Sensor_FA ==FALSE > -60.00 [°C] OAT_PtEstFiltFA ==FALSE	640.00 fail counts out of 800.00 sample counts 320.00 fail counts to enable the open circuit check (P0403) Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR position setpoint in steady state conditions for minimum time HP EGR position closed loop control active No mechanical stop soft approach in progress No anti-sticking procedure in progress No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	> -10.00 [%/s] < 10.00 [%/s] for >= 1.00 [s] EGR_PstnShtOffReq== FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Sensor Circuit Low Voltage	P0405	This monitor checks if the HP EGR position analog sensor is out of electrical range low	analog position raw voltage < low threshold	< 11.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Sensor Circuit High Voltage	P0406	This monitor checks if the HP EGRposition analog sensor is out of electrical range high	analog position raw voltage > high threshold	> 97.70 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit Low	P0407	This monitor checks if the HP EGR cooler inlet coolant temperature sensor is out of electrical range low. The sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	HP EGR cooler inlet coolant temperature resistance value	< 55.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00 ==TRUE ==TRUE > 11.00 [V]	20.00 fail counts out of 24.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit High	P0408	This monitor checks if the HP EGR cooler inlet coolant temperature sensor is out of electrical range high. The sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	HP EGR cooler inlet coolant temperature resistance value	> 134,000.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00 ==TRUE ==TRUE > 11.00 [V]	20.00 fail counts out of 24.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor detects the HP EGR valve mechanically stuck in a certain position different from its defaulted position (fully closed) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR position > maximum threshold	> 5.00 [%]	P0404 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	 > 2.00 [s] EGR_PstnShtOffReq == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit Range/ Performance	P046E	This monitor checks if the HP EGR cooler inlet coolant temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time.	Difference (absolute value) between HP EGR cooler inlet coolant temperature and a reference temperature at power up. Such difference is averaged over a calibrate-able number of samples. Reference temperature is calculated as the mean value between Charge Air Cooler upstream air temperature and Charge Air Cooler downstream air temperature.	> 10.00 [°C]	Test enabled by calibration Diagnostic has not run in current driving cycle yet Key on and engine not running or engine running for less than a calibratable time Runk Crank Relay voltage in range The engine has not run for a minimum time since last key off Absolute value of the difference between Charge Air Cooler upstream air temperature and Charge Air Cooler downstream air temperature No faults detected on engine off timer No electrical or self-correlated faults detected on HP EGR cooler inlet coolant temperature	1.00 ==TRUE ==TRUE < 5.00 [s] > 11.00 [V] >= 28,800.00 [s] <= 10.00 [°C] EngineModeNotRunTimer Error ==FALSE CEW_TempInCktFA ==FALSE CEW_TempInSlfCorFA ==FALSE	Test executed after 1.00 samples are collected and their average is computed. Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor			
					No faults detected on Charge Air Cooler upstream air temperature sensor	CIT_CAC_UpFA==FALSE		
					No faults detected on Charge Air Cooler downstream air temperature sensor	CIT_CAC_DwnFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit Intermittent/ Erratic	P046F	This monitor checks if the HP EGR cooler inlet coolant temperature sensor has an intermittent fault.	HP EGR cooler inlet coolant temperature value	> T_MAX_threshold [° C] OR < T_MIN_threshold [° C] where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails * ts * f) - #fails = number of consecutive samples where the test failed (temperature outside the range) - ts = sensor sampling time - f = inverse of the sensor filter response time (0.08 [Hz]) - T_MAX = sensor maximum actual reading (150.00 [°C]) - T_MIN = sensor minimum actual	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on HP EGR cooler inlet coolant temperature sensor	1.00 ==TRUE ==TRUE > 11.00 [V] CEW_TempInCktFA ==FALSE	40.00 fail counts out of 50.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				reading (-60.00 [°C]) - T_last_good = last good temperature (inside the range) measured by the sensor				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Exceeded Learning Limit	P049D	This monitor checks if the HP EGR position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	analog position raw voltage when the valve is in fully closed position < low threshold OR analog position raw voltage when the valve is in fully closed position > high threshold	< 83.50 [%5V] OR > 93.50 [%5V]	Test enabled by calibration Learning procedure at key off in fully closed position has been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - valve is in fully closed position (measured position smaller than a threshold); - difference between max and min learned values is smaller than a threshold. Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, HP EGR position deviation End Of Trip event has elapsed	== 1.00 >= 60.00 [°C] <= 60.00 [°C] ECT_Sensor_FA == FALSE < 100.00 [%] < 100.00 [%] > 5.00 [V] EGR_PstnShtOffReq == FALSE	1.00 fail counts out of 1.00 sample counts Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring Low	P0545	Controller specific output driver circuit diagnoses t the exhaust gas temperature 1 (EGT1) sensor signal 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.	< 142 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring High	P0546	Controller specific output driver circuit diagnoses the exhaust gas temperature 1 (EGT1) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 1 (EGT1) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. 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.	> 922 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

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

Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case **StrongExhGasWarmUp:** {
			<u>transmission in Gear:</u>
			Fuel quantity of the torque forming pulses
			
			<u>transmission in Park/ Neutral:</u>
			Fuel quantity of the torque forming pulses
			}
			
			case **SoftExhGasWarmUp:** {
			<u>transmission in Gear:</u>
			Fuel quantity of the torque forming pulses
				< 0.5* **P054E_IFM_MinFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and current gear
					
					and depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark (
					<u>CeFULR_e_InGear:</u> transmission
					<u>CeFULR_e_NeutralPark:</u> transmission
					<u>CeFULR_e_InGearNeutralPark:</u> transmission)
					
					and engine speed
					
					and engine speed
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(580.00 , 580.00 + 0.00)[rpm]
						
						<hysteresis(1,430.00 , 1,430.00 + 0.00)[rpm]
							200.00 failures out of 255.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				temperature	and			
			transmission in Park/ Neutral:		(			
			Fuel quantity of the torque forming pulses		OBD Coolant Enable Criteria	== TRUE		
				< 0.5* **P054E_IFM_MinFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature	OR			
					engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
					)			
			}		and			
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):**		outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
			{		and			
			transmission in Gear:		vehicle speed	< 3.00 [kph]		
			Fuel quantity of the torque forming pulses		and			
				< 0.5* **P054E_IFM_MinFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature	enabled in the combustion mode	**P054E_IFM_CombModesEnbl**		
					and			
					Accelerator Pedal Position	<= 0.05 [%]		
			transmission in Park/ Neutral:		and			
			Fuel quantity of the torque forming pulses		Engine running	-		
				< 0.5* **P054E_IFM_MinFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature	and			
					PTO_PTO_Active	== 0 [Boolean]		
					and			
					Run Crank voltage	>= 11.00 [V]		
			}		and			
					No active DTC's:			

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

			default:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				< 0.5* **P054E_IFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					(
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					)
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						(FUL_GenericInjSysFA AND FUL_GenericInjSysFlt)		

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

Idle Control System - Fuel Quantity Higher Than Expected	P054F	This DTC detects if the fuel quantity of the torque forming pulse is higher than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case **StrongExhGasWarmUp**:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				
				> 1.5* **P054F_IFM_MaxFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant temperature
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					{
					CeFULR_e_InGear: transmission
					
					CeFULR_e_NeutralPark: transmission
					
					CeFULR_e_InGearNeutralPark: transmission
					}
					
					and
					engine speed
					
					and
					engine speed
					
					and
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(580.00 , 580.00 + 0.00) [rpm]
						
						< hysteresis(1,430.00 , 1,430.00 + 0.00) [rpm]
							200.00 failures out of 255.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			transmission in Park/ Neutral: Fuel quantity of the torque forming pulses	> 1.5* **P054F_IFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature	{ OBD Coolant Enable Criteria	== TRUE		
					OR engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
			}		}			
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):** {		and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
			transmission in Gear: Fuel quantity of the torque forming pulses	> 1.5* **P054F_IFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature	and vehicle speed	< 3.00 [kph]		
					and enabled in the combustion mode	**P054F_IFM_CombModesEnbl**		
					and Accelerator Pedal Position	<= 0.05 [%]		
					and Engine running	-		
			transmission in Park/ Neutral: Fuel quantity of the torque forming pulses	> 1.5* **P054F_IFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature	and PTO_PTO_Active	== 0 [Boolean]		
					and Run Crank voltage	>= 11.00 [V]		
					and No active DTC's:			
			}		Depending on the **OAT Source Calibration =** CeOATR_e_ECM_OAT_Sensor			
			default:					

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

			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				> 1.5*
				P054F_IFM_MaxFuelIdleC1_G
				[mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5*
				P054F_IFM_MaxFuelIdleC1_PN
				[mm^3] depending on engine speed and engine coolant temperature
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						(FUL_GenericInjSysFA AND FUL_GenericInjSysFlt)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter - SPI error (SPI communication failed)	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 52.00) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 11.00 [V] - - 52.00 [V]	4 failures out of 8 samples 12.5 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 Illum.
Fuel Injector Driver Circuit Performance Bank 1	P062D	This DTC detects if there is: open circuit of the power supply line of the injector or Boost voltage fault or ECU internal fault The monitoring determines if the boost voltage is above a threshold or below another threshlod with hysteresis	Internal ECU Boost Voltage	> 75.00 [V] OR < hysteresis(52.00 , 53.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	14 failures out of 20 samples 6.25 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Glow Plug Circuit Low	P066A	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Glow Plug Circuit High	P066B	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2 = 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Glow Plug Circuit Low	P066C	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Glow Plug Circuit High	P066D	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Glow Plug Circuit Low	P066E	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Glow Plug Circuit High	P066F	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Glow Plug Circuit/Open	P0671	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Glow Plug Circuit/Open	P0672	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Glow Plug Circuit/Open	P0673	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Glow Plug Circuit/Open	P0674	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Glow Plug Circuit Low	P067A	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Glow Plug Circuit High	P067B	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	20.00 fail samples over 40.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Rail Pressure deviation during cut off	P1089	This diagnosis is able to check if, during SQA learning, the pressure set-point requested by SQA is correctly reached and maintained (in rail pressure range defined for SQA), in order to allow SQA to perform the learning.	Fuel Rail pressure	> SQA Rail Pressure Set-point + **KaFADC_p_SQA_Lrn Delt** OR < SQA Rail Pressure Set-point - **KaFADC_p_SQA_Lrn Delt**	Test enabled by calibration All enabling conditions for SQA learning different from Rail Pressure in range are satified Calibrateable delay time since SQA started to request rail pressure set-point has expired.	1.00 FAD_SQA_LrnPresEnbl 3,500.00	800.00 Fail Samples over 1,143.00 samples. 1 Sample every 12,5ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Performance	P10D5	This monitor checks if the CAC down air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler down air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	> 20.00 [°C]	Enablement calibration set to TRUE	== 1.00	Test executed after a counter of 1.00 samples	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>= 0.10 [s]	Functional task: 100 ms	
					Runk Crank Relay voltage in range	> 11.00 [V]		
					The engine has not run for a calibratable time since last key off	>= 28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	< 45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler down air temperature sensors	CIT_CAC_DwnCktFA ==FALSE OR CIT_CAC_DwnSelfCorFA ==FALSE		
					No faults detected on intake manifold air	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature sensor No faults detected on fuel temperature sensor	 FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Low	P10D6	This monitor checks if the CAC down air temperature sensor is out of electrical range low	Charge air cooler down air temperature resistance value < low threshold	< 55.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	> 100,605.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Intermittent/ Erratic	P10D8	This monitor checks if the CAC down air temperature has an intermittent fault	Charge air cooler down air temperature value > T_MAX_threshold Charge air cooler down air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -60.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_DwnCktFA ==FALSE	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 plausibility at key on monitoring	P113B	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 1 (EGT1) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available system temperature sensors (exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratable and the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT1 temperature|	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTCs No elettic puntual error and with **Reference temperature calculation done:** - key on and with - minimum engine-off time and with - Minimum number of sensor available for calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas1_CktTFTKO ==TRUE == TRUE > 28,800.00 [sec] >=4	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 plausibility at key on monitoring	P113C	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 2 (EGT2) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT2 temperature| See the Description Tab for Reference Temperature, (EGT_Avg) definition.	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTCs No elettic puntual error and with **Reference temperature calculation done:** - key on and with - minimum engine-off time and with - Minimum number of sensor available for calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas2_CktTFTKO ==TRUE ==TRUE > 28,800.00 [sec] >=4	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 plausibility at key on monitoring	P113D	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 3 (EGT3) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT3 temperature| See the Description Tab for Reference Temperature, (EGT_Avg) definition	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTC No eletrical puntual error and with **Reference temperature calculation done:** - key on and with - minimum engine-off time and with - Number of sensor available for calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas3_CktTFTKO ==TRUE ==TRUE > 28,800.00 [sec] >=4	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit	P115E	This diagnosis verifies Upstream NOx gen3 sensor O2 binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	open circuit on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit Low Voltage	P115F	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit High Voltage	P1160	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit	P116A	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Linear pin (P-)	open circuit on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit Low Voltage	P116B	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit High Voltage	P116C	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Linear pin (P-)	powershort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit	P116D	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Reference pin(M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit Low Voltage	P116E	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit High Voltage	P116F	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 20.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time No electrical fault detected on Soot Sensor If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass Ambient Air pressure Ambient air pressure sensor not faulty Time since Soot Sensor heating off when the sensor temperature has	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 9.00 V > 0.10 s NOT(SOT_EleclFault) TPTKO on P1477 TPTKO on P1478 > 61.00 KPa AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 600.00 s	No time debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					been stored is Timer since Soot Sensor heating off is not affected by error on module off timer Calculation of the reference temperature at system start up is valid (this also include engine off timer and engine movement) Diagnostic has not yet reported a pass or failure	NOT(ModuleOffTimeErr) EGT_TempAvgVld NOT (TPTKO OR TFTKO) on P118B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 1	P118E	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	(Measured EGT1 - Modeled EGT1) >	150.00 degC	Test Enabled by calibration	1.00	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips
				OR	and			
			(Measured EGT1 - Modeled EGT1) <	-150.00 degC	Battery Voltage	> 11.00 Volts		
					and			
					EGT_EGT1_DiagMdlFlt	== FALSE		
					and			
					Engine Off Timer	> = 0.00 seconds		
					and			
					EGT1 Model Temperature	> -40.00 degC		
					and			
					EGT1 Model Temperature	< 850.00 degC		
					and			
					Dynamick check Valid	==TRUE		
					and			
					No faults on the consumed EGT sensors	EGT_ExhGas1_StkFA and EGT_ExhGas1_StkTFTKO and EGT_ExhGas1_CktFA and		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and	EGT_ExhGas1_CktTFTKO and EGT_ExhGas2_QckChgFA and EGT_ExhGas1_QckChgTFTKO		
					Time since last DPF regeneration	>= 120.00 seconds		
					and			
					Time after warm up	>= 0.00 seconds		
					and			
					Continuos engine run time	>= 120.00 seconds		
					and			
					Fuel Rate and Engine Speed within bounds, determined by calibration map	**EGT1 DynChk EngPtEnbl**		
					and			
					Model Temperature Rate of change limited to:	15.00 degC		
					over a time period of:	CeEGTR_e_IndexMax5000ms		
					Enabling delay time	5.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 2	P118F	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	(Measured EGT2 - Modeled EGT2) >	200.00 degC	Test Enabled by calibration	1.00	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips
				OR	and			
			(Measured EGT2 - Modeled EGT2) <	-200.00 degC				
					Battery Voltage	> 11.00 Volts		
					and			
					EGT_EGT2_DiagMdlFlt	== FALSE		
					and			
					Engine Off Timer	> 0.00 seconds		
					and			
					EGT2 Model Temperature	> -40.00 degC		
					and			
					EGT2 Model Temperature	< 850.00 degC		
					and			
					Dynamick check Valid	==TRUE		
					and			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults on the consumed EGT sensors	EGT_ExhGas2_CktFA and EGT_ExhGas2_CktTFTKO and EGT_ExhGas2_QckChgFA and EGT_ExhGas2_QckChgTFTKO and EGT_ExhGas2_QckChgFA		
					Time since last DPF regeneration	>= 120.00 seconds		
					and			
					Time afert warm up	>= 0.00 seconds		
					and			
					Continuos engine run time	>= 120.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and Fuel Rate and Engine Speed within bounds, determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	**EGT2 DynChk EngPtEnbl** < 15.00 degC CeEGTR_e_IndexMax5000ms 5.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit	P1192	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Low Reference pin (Ref)	open circuit on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit Low Voltage	P1193	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Low Reference pin (Ref)	groundshort on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit High Voltage	P1194	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Low Reference pin (Ref)	powershort on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 3	P1196	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT3 - Modeled EGT3) >	150.00 degC	Test Enabled by calibration	1.00	6.00 fail samples out of 8.00	Type B, 2 Trips
					and		Each sample is 10.00 seconds	
				OR				
				-150.00 degC	Battery Voltage	> 11.00 Volts		
			Measured EGT3 - Modeled EGT3) <		and			
					EGT_EGT3_DiagMdlFlt	== FALSE		
					and			
					Engine Off Timer	> 0.00 seconds		
					and			
					EGT3 Model Temperature	> -40.00 degC		
					and			
					EGT3 Model Temperature	< 850.00 degC		
					and			
					Dynamick check Valid	==TRUE		
					and			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults on the consumed EGT sensors	EGT_ExhGas3_CktFA and EGT_ExhGas3_CktTFTKO		
					and	and EGT_ExhGas3_QckChgFA and EGT_ExhGas3_QckChgTFTKO and EGT_ExhGas3_StkFA and EGT_ExhGas3_StkTFTKO		
					Time since last DPF regeneration	>= 120.00 seconds		
					and			
					Time afert warm up	>= 0.00 seconds		
					and			
					Continuos engine run time	>= 120.00 seconds		
					and			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel Rate and Engine Speed within bounds, determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	**EGT3 DynChk EngPtEnbl** < 15.00 degC CeEGTR_e_IndexMax5000ms 5.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit	P119A	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 NOx-related measurement pin (M2)	open circuit on M2	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit Low Voltage	P119B	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 NOx-related measurement pin (M2)	groundshort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit High Voltage	P119C	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 NOx-related measurement pin (M2)	powershort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit	P119D	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit Low Voltage	P119E	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 NOx-related measurement pin (M2)	groundshort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit High Voltage	P119F	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 NOx-related measurement pin (M2)	powershort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit	P11BE	This diagnosis verifies Dowstream NOx gen3 sensor binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	open circuit on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:P30B5	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit Low Voltage	P11BF	This diagnosis verifies Downstream NOx gen3 sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit High Voltage	P11C0	This diagnosis verifies Downstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached P30B5No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Ground Circuit	P11C5	This diagnosis verifies Upstream NOx gen3 sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 1 heater reference pin (H-)	open circuit on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Ground Circuit High Voltage	P11C6	This diagnosis verifies Upstream NOx gen3 sensor heater ground circuit Short to Battery	Check if there is short circuit to power supply on NOx Sensor 1 heater reference pin (H-)	powershort on H-	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Ground Circuit	P11C7	This diagnosis verifies Downstream NOx gen3 sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 2 heater reference pin (H-)	open circuit on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Ground Circuit High Voltage	P11C8	This diagnosis verifies Dowmstream NOx gen3 sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 2 heater reference pin (H-)	powershort on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	This diagnosis verifies the plausibility of Upstream NOx sensor signal	Check if (Upstream NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -45 % OR > 100.00 %	Engine is running Powertrain relay voltage No failure on any NOx model inputs Injection small quantity adjustment (SQA) learning is not active No failure on NOx1 CAN communication No electrical failure on NOx1 sensor No out of range low failure on NOx1 sensor No out of range high failure on NOx1 sensor No current control failure on NOx1 sensor No failure on outside air temperature sensor No failure on ambient air temperature sensor no falut on upstream catalyst exhaust pressure model inputs No failure on engine	TRUE > 11.00 V EXM_NOxMdl_ExhMnfdNotVld ==FALSE FAD_SQA_LrnET_Enbl ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE NOX_Snsr1_ElecFA ==FALSE NOX_NOx1_OutOfRngLoFlt ==FALSE NOX_NOx1_OutOfRngHiFlt ==FALSE NOX_NOx1_StBitChkFlt ==FALSE OAT_PtEstFiltFA ==FALSE AmbPresDfltdStatus ==FALSE EGP_PresCatUpFlt ==FALSE ECT_Sensor_FA	Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed The signal for the monitor check is calculated at first collecting and averaging 200.00 samples, than filtering the resulting mean value by means of a first-order filter. The filter gain calibration (1) can assume the following values: - 0.35 if FIR is active - 0.20 if RR is active - 0.12 if neither FIR and RR are active (1) The EWMA	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coolant temperature sensor	==FALSE	filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					Modeled Upstream NOx concentration	> 300 ppm		
					Steady state detection: a) Modeled Upstream NOx concentration step at 100 ms. b) condition a) is fulfilled for time	< 3 ppm > 5.00 sec		
					Ambient air pressure	> 75 kPa < 200 kPa		
					Outside air temperature	> -7 °C < 300 °C		
					Combustion mode dependent enabling flag	**NOX_S1_PlausChkEnblCmbMode**		
					Intake manifold absolute pressure	< 300 kPA		
					Injection fuel quantity requested	For normal combustion mode: > 10.00 mm^3 < 35.00 mm^3 For other combustion modes:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						> 15 mm^3 < 30 mm^3		
					Engine speed	For normal combustion mode: > 1,400 rpm < 2,300 rpm For other combustion modes: > 800 rpm < 2,000 rpm		
					Engine coolant temperature	> 60 °C < 126 °C		
					Sensor dewpoint is reached	TRUE		
					Diagnostic test results during EWMA FIR mode	< 1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit	P11D0	This diagnosis verifies Dowstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Linear pin (P-)	open circuit on P-	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit High Voltage	P11D2	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 O2 Linear pin (P-)	powershort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Upstream NOx sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window)	 < -90.00 ppm > 200.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Upstream NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.80 V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 120.00 g/s > 0.00 g/s < 800.00 mg/s > -1.00 mg/s < 3,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 100.00 g and Upstream NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 3.00 sampling windows (each one made up of 5.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range	> 1,100.00 rpm		
					Upstream NOx sensor temperature is within a range	< 600.00 °C > 100.00 °C		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 100.00 mm^3/s < 80.00 mm^3 > 5.00 mm^3 > 1.00 s		
					Intake manifold absolute pressure	< 300.00 kPa		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngLo Flt ==FALSE		
					No out of range high failure on NOx1 sensor	NOX_NOx1_OutOfRngHi Flt ==FALSE		
					No failure on NOx1 sensor signal plausibility	NOX_NOx1_NOxPlausFlt ==FALSE		
					No failure on NOx1 sensor signal dynamic	NOX_NOx1_DynChkFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					No failure on air control system	AIC_AirShtOffReq ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					No failure on Upstream SCR temperature sensor	NOX_Snsr1_TempFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2	P11D5	This diagnosis verifies if Downstream NOx sensor raw signal is affected by an offset	Check if NOx2 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window)	 < -90.00 ppm > 80.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Downstream NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a	**NOX_S2_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.80 V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 120.00 g/s > 0.00 g/s < 800.00 mg/s > -1.00 mg/s < 3,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 100.00 g and Downstream NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 5.00 sampling windows (each one made up of 10.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range	> 1,200.00 rpm		
					Downstream NOx sensor temperature is within a range	< 250.00 °C > 210.00 °C		
					Time after DPF regen modes	> 300.00 s		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 100.00 mm^3/s < 80.00 mm^3 > 8.00 mm^3 > 1.00 s		
					Intake manifold absolute pressure	< 300.00 kPa		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx2 sensor	NOX_Snsr2_FltSt ==FALSE		
					No current control failure on NOx2 sensor	NOX_NOx2_StBitChkFlt ==FALSE		
					No out of range low failure on NOx2 sensor	NOX_NOx2_OutOfRngLoFlt ==FALSE		
					No out of range high failure on NOx2 sensor	NOX_NOx2_OutOfRngHiFlt ==FALSE		
					No failure on NOx2 sensor signal plausibility	NOX_NOx2_SelfDiagFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx2 sensor signal dynamic	NOX_NOx2_DynChkFlt ==FALSE		
					No failure on NOx2 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					No failure on air control system	AIC_AirShtOffReq ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					Upstream SCR temperature is steady state: a) Upstream SCR temperature derivative within a range b) conditions a) is fulfilled for a time	 < 5.00 °C/s > -5.00 °C/s > 100.00 s		
					No failure on Downstream SCR temperature sensor	NOX_Snsr2_TempFlt ==FALSE		
					No failure on upstream SCR temperature	EGT_TempSCR_UpFlt ==FALSE		
					No O2 plausibility in load	OXY_NOx2ChkLoadFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					fault on NOx2	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit	P11D8	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit Low Voltage	P11D9	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit High Voltage	P11DA	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Current Range/ Performance - Bank 1 Sensor 1	P11DB	This diagnosis verifies that Upstream NOx sensor embedded current control circuit status is healthy	Check if the NOx1 sensor embedded stability criteria of Nox/Lambda current control circuit are violated	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Ip1 within the interval of -40uA... 19uA b) Delta Ip0 < 300 uA /10 msec c) Delta Ip1 z 2.4 uA around its set point > 1 % > 1 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx1 sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	> 11.00 V TRUE FALSE > 10.80 V TRUE TRUE < 0.03 % >- 0.03 % > 10.00 sec TRUE NOX_Snsr1_FltSt ==FALSE **NOX_S1_StBitChkEnblCmbMode** <= 50.00 mm^3/s >= -50.00 mm^3/s > 3.00 sec	NOx stability flag time counter: 1 fails out of 1 samples Lambda stability flag time counter: 1 fails out of 1 samples Task=12.5ms	Type B, 2 Trips

NOx stability flag: (OFF_Time/TOTAL_time)

Lambda stability flag: (OFF_Time/TOTAL_time)

Note:
TOTAL_time= ON_time +OFF_Time

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Current Range/ Performance - Bank 1 Sensor 2	P11DC	This diagnosis verifies that Downstream NOx sensor embedded current control circuit status is healthy	Check if the NOx2 sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note:	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Ip1 within the interval of -40uA... 19uA b) Delta Ip0 < 300 uA /10 msec c) Delta Ip1 z 2.4 uA around its set point > 1 % > 1 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx2 sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	> 11.00 V TRUE FALSE > 10.80 V TRUE TRUE < 0.03 % >- 0.03 % > 10.00 sec TRUE NOX_Snsr2_FltSt ==FALSE **NOX_S2_StBitChkEnblCmbMode** <= 50.00 mm^3/s >= -50.00 mm^3/s > 3.00 sec	NOx stability flag time counter: 1 fails out of 1 samples Lambda stability flag time counter: 1 fails out of 1 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			TOTAL_time= ON_time +OFF_Time					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit	P11FC	This diagnosis verifies Dowstream NOx gen3 sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Low Reference pin (Ref)	open circuit on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit Low Voltage	P11FD	This diagnosis verifies Downstream NOx gen3 sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Low Reference pin (Ref)	groundshort on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit High Voltage	P11FE	This diagnosis verifies Downstream NOx gen3 sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Low Reference pin (Ref)	powershort on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Supply Circuit	P122B	This monitor checks if the Throttle DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit Shorted	P122C	This monitor checks if the Throttle commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Exceeded Learning Limit (SENT position sensor)	P122D	This monitor checks if the Throttle position SENT sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold	< 85.80 [%5V] OR > 93.80 [%5V]	Test enabled by calibration Key signal is off Learning procedure enabled: - no faults present on engine coolant temperature sensor; - the engine coolant tempearture is in range. Position control in closed loop: battery voltage above a threshold. No faults present on Throttle position sensor, Throttle valve, Throttle position deviation End Of Trip event has elapsed	== 1.00 ECT_Sensor_FA == FALSE >= 60.00 [°C] <= 150.00 [°C] > 5.00 [V] TPS_PstnShtOffReq== FALSE	1.00 fail counts out of 1.00 sample counts Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Positive Voltage Control Circuit Shorted to Control Circuit	P1248	This DTC detects a shorted load on Injector 1	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 2 Positive Voltage Control Circuit Shorted to Control Circuit	P1249	This DTC detects a shorted load on Injector 2	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 3 Positive Voltage Control Circuit Shorted to Control Circuit	P124A	This DTC detects a shorted load on Injector 3	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 4 Positive Voltage Control Circuit Shorted to Control Circuit	P124B	This DTC detects a shorted load on Injector 4	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 5 Positive Voltage Control Circuit Shorted to Control Circuit	P124C	This DTC detects a shorted load on Injector 5	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 6 Positive Voltage Control Circuit Shorted to Control Circuit	P124D	This DTC detects a shorted load on Injector 6	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 7 Positive Voltage Control Circuit Shorted to Control Circuit	P124E	This DTC detects a shorted load on Injector 7	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Injector 8 Positive Voltage Control Circuit Shorted to Control Circuit	P124F	This DTC detects a shorted load on Injector 8	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 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 Illum.
Cylinder 1 electrical resistance rationality check	P1307	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 1 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 2.00 VeGLOD_b_RunCrankVoltRec = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 electrical resistance rationality check	P1308	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 2 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystem Dsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 2.00 VeGLOD_b_RunCrankVoltRec= FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 electrical resistance rationality check	P1309	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 3 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystem Dsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 2.00 VeGLOD_b_RunCrankVoltRec = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 electrical resistance rationality check	P130A	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 2.00 VeGLOD_b_RunCrankVoltRec = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Circuit Shorted	P1407	This monitor checks if the HP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Current Range/ Performance	P140F	This monitor checks if an excessive current flows through the HP EGR DC-Motor (e.g. shunt circuit between load, HP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on HP EGR DC Motor current range/performance H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V] EGR_MtrCurrLimTFTKO == FALSE	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Motor Overtemperature	P1424	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Motor Overtempera ture	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module High Temperature	P142B	This diagnosis detects a soot sensor control unit overtemperature caused by an aged solder joint inside soot sensor control unit	Soot Sensor Control Unit Temperature 1 OR Soot Sensor Control Unit Temperature 2	> 140.00 °C > 134.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine not in cranking mode Fault not detected on undervoltage for Soot Sensor Control Unit supply No Electrical faults present on Soot Sensor	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_ElecIFault)	Time counter: 20.00 failures out of 40.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor A Circuit Low	P142C	This diagnosis detects a short circuit to ground on soot sensor control unit temperature 1 signal line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 1 Circuit Signal	< 0,3 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor A Circuit High	P142D	This diagnosis detects an open circuit on soot sensor control unit temperature 1 signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 1 Circuit Signal	> 4,97 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor B Circuit Low	P142E	This diagnosis detects a short circuit to ground on soot sensor control unit temperature 2 signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 2 Circuit Signal	< 0,03V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor B Circuit High	P142F	This diagnosis detects an open circuit on soot sensor control unit temperature 2 signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 2 Circuit Signal	> 4,7 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor A/B Correlation	P1435	This diagnosis detects a drifted soot sensor control unit temperature sensor 1 or drifted soot sensor control unit temperature sensor 2	Absolute value of the difference between Soot Sensor Control Unit Temperature Sensor 1 and Soot sensor Control Unit Temperature Sensor 2	> 10.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine not in cranking mode Fault not detected on undervoltage for Soot Sensor Control Unit supply No Electrical faults present on Soot Sensor	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_EleclFault)	Time counter: 15.00 failures out of 30.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too Low	P144E	DPF Control Temperature Deviation diagnostic monitorsthe exhaust gas temperature Downstream the 1st ccDOC (EGT2) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic	**LowTemperature monitoring (Positive Deviation):** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	> 100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DOC downstream temperature sensor Combustion mode different from LNT Desox Lean and LNT Engine Protection Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	1.00 [Boolean] DPF_DPF_St== Warm_Up EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF_TempDeviation** [Boolean]	800.00 fail samples out of 1,000.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow AND	< 100.00 [g/s]		
					Exhaust mass flow	> 10.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					The system shall not be in cut off for a calibratable timer.	< 5.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 5.00 [sec]		
			Low Temperature monitoring (Positive Deviation):		Test shall be enabled by calibratable flag	1.00 [Boolean]	800.00 fail samples out of 1,000.00 samples	
			Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	> 90.00 degC	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state	Function task: 100ms	
					DPF temperature closed loop control shall be enabled	EGT_DsblCL == Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on ccDOC Downstream temperature sensor	EGT_SnsrCatDwnFlt [Boolean]		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF_TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 100.00 [g/s] > 10.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					The system shall not be in cut off for a calibratable time	< 5.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 2.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too High	P144F	DPF Control Temperature Deviation diagnostic monitorsthe exhaust gas temperature Downstream the 1st ccDOC (EGT2) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring runs only in DPF steady state logic	**Hi Temperature monitoring (Negative Deviation):** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	< -90.00 degC	Test shall be enabled by calibratable flag Regeneration state in Steday state DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on ccDOC Downstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Exhaust mass flow	1.00 [Boolean] DPF_DPF_St== Steady state EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF_TempDeviation** [Boolean] < 100.00 [g/s]	650.00 fail samples out of 800.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND Exhaust mass flow	> 10.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					The system shall not be in cut off for a calibratable timer.	< 5.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 2.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Electrode Supply Circuit Open	P1474	This diagnosis detects an open circuit on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electode supply voltage signal (i.e. measured ADC voltage for electrode current)	< 0.3 V	Soot Sensor Control Unit conditions: Battery Voltage Soot Sensor Electrode Supply Voltage ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 9 V = 45,6V > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 3.00 failures out of 5.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Electrode Supply Circuit Low	P1475	This diagnosis detects a short to ground on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	U < 41.55 V OR U > 49.72 V	Soot Sensor Control Unit conditions: Battery voltage Soot Sensor Electrode High Voltage Enabled ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 9 V > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Electrode Supply Circuit High	P1476	This diagnosis detects a short to power on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode voltage signal (measured ADC voltage for electrode current)	> 4.7 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 15.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips
			Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	> 2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage Disabled ECU conditions: Ignition voltage in range	 >	Time counter: 15.00 failures out of 20.00 samples 100 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						11.00		
					Soot Sensor bus relay is commanded on	NOT(SBR_RlyFA)		
					No electrical fault active on Soot Sensor bus relay	NOT(U02A3)		
					No faults of CAN communication loss with Soot Sensor			
					Key is turned on			
					Engine not in cranking mode	NOT(P24D0)		
					Fault not active on undervoltage for Soot Sensor Control Unit supply			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Temperature Circuit Low Input	P1477	This diagnosis detects a short to ground on the soot sensor temperature signal	Diagnosis executed in Soot Sensor Control Unit: Voltage of Soot Sensor temperature meander (TM) signal	< 0.3 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 2.00 failures out of 2.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Temperature Circuit High Input	P1478	This diagnosis detects a short to power or an open circuit on the soot sensor temperature signal	Diagnosis executed in Soot Sensor Control Unit: Voltage of Soot Sensor temperature meander (TM) signal	> 3 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 2.00 failures out of 2.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Sensitivity Factor Performance	P1479	This diagnosis detects a soot sensor memory corruption	Soot sensor sensitivity factor is	< -0.25 OR > 0.25	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_ElecIFault) NOT(P24D0)	Time counter: 50.00 failures out of 100.00 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 Illum.
Particulate Matter Sensor Shunt Circuit High Current	P147B	This diagnosis detects a no more efficient soot sensor	Soot Sensor Electrode raw current	> 5.00 A	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No Soot Sensor supply undervoltage detected No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Soot Sensor is in measurement phase Soot Sensor Electrode supply voltage Soot Sensor temperature Soot Sensor Electrode current measurement enabled	 > 11.00 NOT(SBR_RlyFA) NOT(P24D0) NOT(U02A3) NOT(SOT_EleclFault) 41.00 V < U < 50.00 V 200.00 °C < T < 425.00 °C	No time debouce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Protection Tube Performance	P1488	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	Integrated derivative of corrected volumetric flow AND Integrated derivative of effective soot sensor heater voltage (i,e, cumulated heater voltage change)	> 1,000.00 < 2.25 V	Key is turned on Ignition voltage in range Engine in running mode Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor No fault on exhaust gas pressure estimation at sensor location No fault on exhaust gas temperature estimation at sensor location No fault on gas mass flow estimation at sensor location Soot Sensor in protection heating operating state Derivative in volumetric flow	 > 11.00 NOT(SBR_RlyFA) (U02A3) NOT(P24D0) NOT(SOT_EleclFault) SOT_ExhPresSootSnsrVld SOT_ExhTempSootSnsrVld SOT_TotExhSootSnsrVld 0.50 < d2V < 300.00	No debounce time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	> = 1.00 s		
					At InitCntrlr time since engine off	> 28,800.00 s		
					At InitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop	> 22.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off)	> 0.00 s		
					Exhaust gas temperature at Soot Sensor	0.00 < T < 200.00 °C		
					Environmental pressure	> 74.8 kPa		
					Diagnostic has not yet reported a pass or failure			
					The sign of derivative in volumetric flow does not change for a time	>= 1.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug Positive Voltage Circuit	P161E	This DTC checks the circuit for electrical integrity during operation. Glow plugs supply pin open circuit or shorted to ground.	Voltage feedback under a calibratable threshold	Voltage_feedback < 6.00	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_On interface is true; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeGLOO_b_GlowPlugEnbld = TRUE; VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit A Low (SENT position sensor)	P16A0	This monitor checks if the Throttle SENT position sensor protocol is out of range low	HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status	> 6.25 [ms] AND == STEADY LOW	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit A High (SENT position sensor)	P16A1	This monitor checks if the Throttle SENT position sensor protocol is out of range high	HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status	> 6.25 [ms] AND == STEADY HIGH	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit A Performance (SENT position sensor)	P16A2	This monitor checks if the Throttle SENT position sensor protocol has performance problems	HWIO message fault on Throttle SENT position == TRUE OR (number of Throttle SENT position counters has been updated AND HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE))	message error == TRUE OR (---------- AND > 6.25 [ms])	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range	== 1.00 > 11.00 [V] TPS_SENT_OOR_Flt == FALSE	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter not used) - (SW 18.19 and beyond)	P2002	This diagnosis detects a cracked Diesel Particulate FIlter	{The level of soot calculated by a prediction model is for certain time OR soot sensor current is for certain time} AND predicted soot sensor level averaged over a number of different diagnostic runs (>= 1 runs) is	>= 1.80 (0= no soot) > 1.00 s >= 12.00 µA >= 1.00 s < 1.75	Test enabled by calibration (TRUE--> enable FALSE --> disable) Ignition voltage in range for a time Engine running or engine cranking or in auto-stop phase No faults on soot sensor DPF soot loading (ranked model) Engine out soot model realiable Note: the not reliability shall be verified for 1 s before to be declared No faults on downstream DPF temperature sensor or model No faults on downstream DPF mass airflow No faults on engine out soot model Ambient temperature During sensor measurement phase, Number of Autostop events During sensor	1.00 > 0.00 s NOT (SOT_SootSnsrFlt) > -1.00 % NOT (EXM_PM_TurbFlowNotRlb) SOT_ExhTempSootSnsrVld SOT_TotExhSootSnsrVld NOT (SOT_PM_DPF_UpFlt) > -20.00 °C < 20.00	The number of runs to perform the diagnostic test >= 1.00	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					measurement phase, Duration of Autostop phase During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is If EWMA filter is disabled (TRUE--> enable FALSE --> disable)	< 200.00 s <= 1,000.00 0.00 = 0 (false)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Control Stuck Closed (Swirl with Position Feedback)	P2006	This monitor checks if the Swirl actuator got stuck in closed position	position after P20F8 has set > threshold	> 100.00 [%]	Test enabled by calibration	== 1.00	No debounce is present: DTC sets as soon as the error is present	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]	Function task: 25 ms	
					Engine coolant temperature >= threshold	>= 60.00 [°C]		
					Time elapsed since the smart actuator switched on greater than a threshold	>= 5.00 [s]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature >= threshold	>= -60.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Absolute value of position setpoint is in steady state conditions for a certain time	< 50.00 [%/s] for 0.50 [s]		
						SWC_DrvrCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults present on Swirl driver actuator No faults present on Swirl position feedback No faults present on Swirl position deviation No faults present on Swirl Integrity or slow response	==FALSE SWC_PstnFdbckElecFA ==FALSE SWC_ObstructionFlt ==FALSE SWC_IntegSlowRespFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Control Control Circuit (Swirl with Position Feedback)	P2008	This monitor checks if the Swirl command is in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	12.00 fail counts out of 15.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Control Control Circuit Low Voltage (Swirl with Position Feedback)	P2009	This monitor checks if the Swirl command is shorted to ground	Resistance to ground lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	12.00 fail counts out of 15.00 sample counts Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Performance (Swirl with Position Feedback)	P200A	This monitor checks if the Swirl mechanical stop learnings are inside the plausible range and if the valve is not excessively slow	raw position when the flaps are in fully closed position < low threshold OR raw position when the flaps are in fully closed position > high threshold OR raw position when the flaps are in fully open position < low threshold OR raw position when the flaps are in fully open position > highthreshold	< 79.90 [%] OR > 92.90 [%] OR < 26.25 [%5V] OR > 36.50 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Engine coolant temperature greater than threshold No faults present on engine coolant temperature sensor No faults present on Swirl driver actuator No faults present on Swirl position feedback End Of Trip event has elapsed	== 1.00 > 11.00 [V] >= 60.00 [°C] ECT_Sensor_FA ==FALSE SWC_DrvrCktFA ==FALSE SWC_PstnFdbckElecFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			response time in closing direction > high threshold OR response time in opening direction > high threshold OR total time needed to complete either closing or opening phase of the slow response test >= high threshold	> 5.00 [s] OR > 5.00 [s] OR >= 10.00 [s]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Engine coolant temperature greater than threshold Time elapsed since the smart actuator switched on greater than a threshold No faults present on engine coolant temperature sensor No faults present on Swirl driver actuator No faults present on Swirl position feedback End Of Trip event has elapsed	== 1.00 > 11.00 [V] >= 60.00 [°C] >= 5.00 [s] ECT_Sensor_FA ==FALSE SWC_DrvrCktFA ==FALSE SWC_PstnFdbckElecFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Over Temperature Bank (DOC_DPF_ SCR)(EGT2)	P200C	This diagnosis verify if the exahust gas temperature on DPF Upstream (EGT_DPF_Up) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Upstream Exhaust gas temperature	I**n Regeneration mode:** > 850.00 [°C] **In Normal mode:** > 800.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on DPF Upstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_UpFlt [Boolean]	30.00 fail samples out of 40.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Extreme Event monitoring: DPF Upstream Exhaust gas temperature	 > 900.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on DPF Upstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_UpFlt [Boolean]	In Normal mode: 200.00 fail samples out of 300.00 samples In Regeneration mode: 200.00 fail samples out of 300.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Control Circuit High Voltage (Swirl with Position Feedback)	P2010	This monitor checks if the Swirl command isshorted to power supply	Resistance to supply lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	12.00 fail counts out of 15.00 sample counts Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Position Sensor Range/ Performance (Swirl with Position Feedback)	P2015	This monitor checks if the Swirl position feedback has a frequency too high or too low	(Swirl position pulse period < low threshold OR Swirl position pulse period > high threshold) AND Swirl duty cycle AND Swirl duty cycle	 < 11.70 [ms] > 13.30 [ms] != 0% != 100%	Test enabled by calibration System out of the cranking phase Time elapsed since the smart actuator switched on greater than a threshold PT relay supply voltage in range	== 1.00 >= 5.00 [s] > 11.00 [V]	52.00 fail counts out of 62.00 sample counts Function task: 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Position Sensor Circuit Low (Swirl with Position Feedback)	P2016	This monitor checks if the Swirl position feedback is out of electrical range low	Swirl position pulse period == maximum constant pulse period AND Swirl duty cycle	== 24.30 [ms] == 0%	Test enabled by calibration System out of the cranking phase Time elapsed since the smart actuator switched on greater than a threshold PT relay supply voltage in range	== 1.00 >= 5.00 [s] > 11.00 [V]	50.00 fail counts out of 62.00 sample counts Function task: 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Position Sensor Circuit High (Swirl with Position Feedback)	P2017	This monitor checks if the Swirl position feedback is out of electrical range high	Swirl position pulse period == maximum constant pulse period AND Swirl duty cycle	== 24.30 [ms] == 100%	Test enabled by calibration System out of the cranking phase Time elapsed since the smart actuator switched on greater than a threshold PT relay supply voltage in range	== 1.00 >= 5.00 [s] > 11.00 [V]	50.00 fail counts out of 62.00 sample counts Function task: 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring Low	P2032	Controller specific output driver circuit diagnoses t the exhaust gas temperature 2 (EGT2) sensor signal 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.	< 142.00 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring High	P2033	Controller specific output driver circuit diagnoses the exhaust gas temperature 2 (EGT2) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 2 (EGT2) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. 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.	> 922.00 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 quick change monitoring	P2081	This diagnosis verify if the EGT1 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT1 output reistance - EGT1 output resistance old|	> 10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with Battery voltage and with key on and with No electrical faults on EGT1 sensor in and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas1_TFTKO and with EGT_ExhGas1_FA	20 fail samples out of 40 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 quick change monitoring	P2085	This diagnosis verify if the EGT2 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT2 output reistance - EGT2 output resistance old|	> 10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical faults on EGT2 sensor in and logic	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGT_ExhGas2_TFTKO and with EGT_ExhGas2_FA	20 fail samples out of 40 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Control Circuit Performance (Swirl with Position Feedback)	P20F8	This monitor checks if the Swirl flaps got mechanically stuck in any positions	Absolute value of position tracking error (setpoint position - measured position) > positive threshold	> 10.00 [%]	Test enabled by calibration	== 1.00	80.00 fail counts out of 100.00 sample counts Function task: 25 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Engine coolant temperature >= threshold	>= 60.00 [°C]		
					Time elapsed since the smart actuator switched on greater than a threshold	>= 5.00 [s]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside airtemperature >= threshold	>= -60.00 [°C]		
					No faults present on outside airtemperature sensor	OAT_PtEstFiltFA ==FALSE		
					Absolute value of position setpoint is in steady state conditions for a certain time	< 50.00 [%/s] for 0.50 [s]		
					No faults present on Swirl	SWC_DrvrCktFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					driver actuator No faults present on Swirl position feedback No faults present on Swirl position deviation No faults present on Swirl Integrity or slow response	SWC_PstnFdbckElecFA ==FALSE SWC_ObstructionFlt ==FALSE SWC_IntegSlowRespFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 1 Low Voltage	P2147	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage high across High Side Driver of bank 1 (injector 1 and 4) during On state indicates short to ground	impedence between HS pin of injector 1 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderA OR FUL_OutEnblCyl_CiEPSR_CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR_CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 1 High Voltage	P2148	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage low across High side drive of bank 1 (injector 1 and 4) during off state indicates short to power	impedence between HS pin of injector 1 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderA OR FUL_OutEnblCyl_CiEPSR_CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR_CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 2 Low Voltage	P2150	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage high across High Side Driver of bank 2 (injector 2 and 5) during On state indicates short to ground	impedence between HS pin of injector 2 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderB OR FUL_OutEnblCyl_CiEPSR_CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR_CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 2 High Voltage	P2151	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage low across High side drive of bank 2 (injector 2 and 5) during off state indicates short to power	impedence between HS pin of injector 2 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderB OR FUL_OutEnblCyl_CiEPSR_CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR_CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 3 Low Voltage	P2153	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage high across High Side Driver of bank 3 (injector 6 and 7) during On state indicates short to ground	impedence between HS pin of injector 6 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderG OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 3 High Voltage	P2154	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage low across High side drive of bank 3 (injector 6 and 7) during off state indicates short to power	impedence between HS pin of injector 6 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderG OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 4 Low Voltage	P2156	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage high across High Side Driver of bank 4 (injector 3 and 8) during On state indicates short to ground	impedence between HS pin of injector 3 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderH OR FUL_OutEnblCyl_CiEPSR_CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR_CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
Injector Positive Voltage Control Circuit Group 4 High Voltage	P2157	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage low across High side drive of bank 4 (injector 3 and 8) during off state indicates short to power	impedence between HS pin of injector 3 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderH OR FUL_OutEnblCyl_CiEPSR_CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR_CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 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 Illum.
NOx Sensor Circuit Low Bank 1 Sensor 1	P2202	This diagnosis verifies Upstream NOx sensor read out of range low	Check if the NOx1 sensor NOx concentration raw read is out of lower range: NOx raw read	 < -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag	> 0 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A > 10.80 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMinCmbMode**	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit High Bank 1 Sensor 1	P2203	This diagnosis verifies Upstream NOx sensor read out of range high	Check if the NOx1 sensor NOx concentration raw read is out of higher range: NOx raw read	 > 2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag Engine running for a time longer than	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A > 10.80 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMaxCmbMode** 0.00 s	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit	P2205	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Supply pin (H+)	open circuit on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V P30B4	Time counter: 20 fails out of 40 samples Task=25ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit High Voltage	P2207	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit	P2208	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Sense pin (HTemp)	open circuit on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 1	P2209	This diagnosis verifies if the Upstream NOx sensor Heater raw resistance is in range	This diagnosis verifies if the Upstream NOx sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	 > 0.03 % <- 0.03 %	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_A NOx Sensor Bus relay is commanded ON Delay timer once sensor supply is in range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active	> 11.00 V FALSE TRUE > 45 sec > 180 sec > 5 sec 30 sec	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	This diagnosis verifies if the supply voltage of the Upstream Nox sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage < 10.80 V	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON a) NOx sensor Dewpoint is reached b) condition a) shall be fulfilled for time CAN_LostComm_FltN_BusB_NOxSnsr_A No DTC active:	TRUE > 11.00 V TRUE TRUE > 0 sec FALSE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	This diagnosis verifies if the supply voltage of the Downstream Nox sensor is out of range	Check if NOxSensor 2 supply voltage status is out of range	Sensor supply voltage < 10.80 V	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON a) NOx sensor Dewpoint is reached b) condition a) shall be fulfilled for time CAN_LostComm_FltN_BusB_NOxSnsr_B No DTC active:	TRUE > 11.00 V TRUE TRUE > 0 sec FALSE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit Low Voltage	P2210	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 Heater Sense pin (HTemp)	groundshort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit High Voltage	P2211	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply NOx Sensor 1 Heater Sense pin (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Filter Deteriorated/ Missing Substrate Bank 1 - (SW 18.19 and beyond)	P226D	Low Flow Resistance monitoring detects a Diesel Particulate Filter removed or broken or a Diesel Particulate Filer pressure sensor pipe disconnected, clogged, or blocked	Filtered Flow resistance (DPF_ResistFlowFltd)	< **Flow Resistance Too Low Threshold**	Test enabled by calibration (TRUE--> enable FALSE --> disable) No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality) No fault on air flow meter No fault on atmospheric pressure sensor DPF status in soot loading phase (no regeneration ongoing) Engine speed No fault on exhaust mass flow estimation Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time Soot trapped in the DPF is between two thresholds	1.00 EGP_DiffPresSnsrFlt (EGT_SnsrDPF_UpFlt) MAF_MAF_SnsrFA OR MAF_MAF_SnsrTFTKO AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd DPF_DPF_St == CeDPFR_e_SootLoading > 500.00 [rpm] EXF_TotExhDPF_UpFA > 20.00 [l/s] for > 2.00 [s] -1.00 [Pct] < Soot < 100.00 [Pct]	120.00 failures over 150.00 samples Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time Engine Coolant Temperature Ambient Temperature The distance covered since last regeneration Correction of CCB model The fuel request is between 2 calibrateable thresholds for a minimum calibreable time	0.00 [DegC] < Temperature < 600.00 [DegC] for > 2.00 [s] > -256.00 [DegC] > -20.00 [DegC] > -1.00 [km] < 51.00 [%] **Lo_FR_MontrEnblLoThrsh** [mm^3] < Fuel < **Lo_FR_MontrEnblHiThrsh** [mm^3] for > 0.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Out of Range During Deceleration Bank 1 Sensor 1 (SCR: NOx Sensor Downstream Turbine)	P2297	This DTC aims to detect a drift of measured O2 value (A) from an estimated concentration (B) when the latter can be considered stable during overrun condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 4.00 [%] < -6.00 [%]	Engine running System voltage in range Sensor is fully operative No SQA learning is active Enabled in combustion mode No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE FAD_SQA_LrnET_Enbl == FALSE refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**) < 300.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdlFlt OXY_NOx1SignRngChkFlt FHP_InjLeakageFA EGR_PstnShtOffReqFA LPE_PstnShtOffReqFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO)	Once per trip Note: if EWMA Fast Initial Response is active OR EWMA Rapid Response is active than 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 Illum.
						(MAP_SensorFA AND MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 2.00 [s]		
					a. Engine speed in operating range	> 1,100 [rpm] < 3,000 [rpm]		
					b. EGR position	< 60.00 [%]		
					c. LPE position	< 0.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 75.00 [mg] < 1,500.00 [mg]		
					Estimated O2 concentration stable i.e. difference between initial and actual value	< 0.50 [%]		
					Air mass flown since fuel cut-off condition	> 20.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Downstream NOx sensor read out of range low	Check if the NOx2 sensor NOx concentration raw read is out of lower range: NOx raw read	 < -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 sensor No electrical failure on NOx2 sensor Combustion mode dependent enabling flag No O2 plausibility in load fault on NOx2	> 0 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 10.80 V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMinCmbMode** OXY_NOx2ChkLoadFlt ==FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	This diagnosis verifies Downstream NOx sensor read out of range high	Check if the NOx1 sensor NOx concentration raw read is out of higher range: NOx raw read	 > 3,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 sensor No electrical failure on NOx2 sensor Combustion mode dependent enabling flag No O2 plausibility in load fault on NOx2	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 10.80 V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMaxCmbMode** OXY_NOx2ChkLoadFlt ==FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit	P22A3	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Supply pin (H+)	open circuit on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V P30B5	Time counter: 20 fails out of 40 samples Task=25ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit Low Voltage	P22A4	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense Circuit	P22A6	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Sense pin (HTemp)	open circuit on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 2	P22A7	This diagnosis verifies if the Downstream NOx sensor Heate raw resistance is in range	This diagnosis verifies if the Downstream NOx sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_B NOx Sensor Bus relay is commanded ON Delay timer once sensor supplyisin range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active	> 11.00 V FALSE TRUE > 45 sec > 180 sec > 5 sec 30 sec	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense Low Voltage	P22A8	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Sense pin (HTemp)	groundshort on HTemp	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense High Voltage	P22A9	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE > 11.00 V TRUE FALSE > 10.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	P22FE	This diagnosis verifies the Downstream NOx sensor sensing cells integrity during afterrun	Check if there is any clogging in the Downstream NOx sensor measurement cavities that could result in reduced NOx-sensitivity. The sensor internal operating current set-points are changed such way, that the O2 concentration in 2nd sensor cavity is around 1000ppm. One test result is measured in fresh sensor state (at supplier plant) and stored in the sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	> 150 % OR < 50 %	No electrical failure on NOx2 sensor No out of range low failure on NOx2 sensor No out of range high failure on NOx2 sensor No failure on NOx2 CAN communication No electrical failure on NOx1 sensor No failure on O2 from NOx1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on crank sensor No failure on exhaust temperature sensor (downstream SCR) No failure on HC injector No failure on Vehicle Speed sensor	NOX_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLo Flt ==FALSE NOX_NOx2_OutOfRngHi Flt ==FALSE CAN_LostComm_FltN_Bu sB_NOxSnsr_B ==FALSE NOX_Snsr1_ElecFA ==FALSE OXY_NOx1_O2_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE CrankSensor_FA ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Fast Initial Response EWMA is active then 2 test per trip are allowed	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx2 dynamic check	NOX_NOx2_DynChkFlt ==FALSE		
					No failure on any input of SCR chemical model	SCR_ChemicalMdlFlt ==FALSE		
					No current control failure on NOx2 sensor	NOX_NOx2_StBitChkFlt ==FALSE		
					No O2 plausibility in load fault on NOx2	OXY_NOx2ChkLoadFlt ==FALSE		
					Powertrain relay voltage	> 11.00 V		
					NOx2 sensor supply in range	> 10.80 V		
					NOx2 sensor dewpoint is reached	TRUE		
					(NOx2 Sensor heater raw resistance - NOx2 sensor heater target resistance) / NOx2 sensor heater target resistence	< 0.03 % >- 0.03 %		
					a)combustion mode dependent enabling flag	**NOX_NOx2SelfTstEnblCmbMode**		
					b) condition a) is fulfilled for time	> 60 sec		
					c) engine speed	> 0 rpm < 1,000 rpm		
					d) condition c) is fulfilled for time	> 1 sec		
					e) After injection pulse is not used for time	> 0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					f) exhaust temperature sensor (downstream SCR)	> -7 °C < 400 °C		
					g) exhaust mass flow	< 20 g/s		
					h) NH3 concentration	< 20 ppm		
					j) conditions f) g) h) are fulfilled for time	> 5 sec		
					k) O2 concentration from NOx1	> 0 %		
					i) NOx concentration from NOx1	< 300 ppm		
					l) conditions k) i) are fulfilled for time	> 0 sec		
					m) duty cycle applied to the HC injector driver	< 1 %		
					n) condition m) is fulfilled for time	> 5 sec		
					o) time between key off and last overrun	> 15 sec		
					p) time between key off and last DPF regen	> 15 sec		
					q) engine speed in idle range	< 1,000 rpm		
					r) fuel request in idle range	< 20 mm^3		
					s) conditions q) r) is fulfillled for time	< 1,800 sec		
					t) timer of condition s) is			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					reset if one of the following condition is fulfilled (idle off recognition - t) conditions):			
					t.1) exhaust temperature (downstream SCR)	> -7 °C		
					t.2) condition t.1) is fulfilled for time (once idle has been detected)	> 5 sec		
					t.3) vehicle speed	> 5 mph		
					t.4) condition t.3) is fulfilled for time (once idle has been detected)	> 5 sec		
					t.5) exhaust mass flow	> 20 g/sec		
					t.6) condition t.5) is fulfilled for time (once idle has been detected)	> 5 sec		
					u) HC mass flow (SCR downstream)	< 6 g/s		
					Once u) condition is fulfilled the following additional u.x) conditions shall be fulfilled to enable the monitor (AND logic)			
					u.1) exhaust temperature (downstream SCR)	> -7 g/s		
					u.2) condition u.1) is fulfilled for time (once condition u) has been detected)	> 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					u.3) vehicle speed u.4) condition u.3) is fulfilled for time (once condition u) has been detected) u.5) exhaust mass flow u.6) condition u.5) is fulfilled for time (once condition u) has been detected) v) deceleration before keyoff. w) condition v) could be ignored if idle engine condition w.x) is fulfilled w.1) engine speed in idle range w.2) condition w.1) fulfilled for time Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off	> 5 mph > 10 sec > 20 g/s > 5 sec < 0.00 m/s < 0.00 rpm < 0.00 rpm > 0.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 stuck in range monitoring	P242B	This diagnosis verify if the EGT3 temperature doesn't change when it is supposed to change (after a ceratin time from the key on)	Rising in the EGT3 temperature does not reach an applicable minimum rise within a period of time	<= **EGT3 Stuck Temperature Variation** [°C] > **EGT3 Stuck Wait Time** [sec] > **EGT3 Fuel request integral**	Test enabled by calibration and with Engine running and with No faults on EGT3 sensor (electrical and plausibilityin and logic) and with minimum engine-off time and with Battery voltage	1 [Boolean] == TRUE EGT_ExhGas3_CktFA and with EGT_ExhGas3_CktTFTKO and with EGT_ExhGas3_RatFA and with EGT_ExhGas3_RatTFTKO and EGT_ExhGas3_QckChgFA and EGT_ExhGas3_QckChgTFTKO > 3,600.00 [sec] > 11.00 [V]	No debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring Low	P242C	Controller specific output driver circuit diagnoses t the exhaust gas temperature 3 (EGT3) sensor signal 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.	< 142.00 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring High	P242D	Controller specific output driver circuit diagnoses the exhaust gas temperature 3 (EGT3) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 3 (EGT3) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. 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.	> 922.00 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 quick change monitoring	P242E	This diagnosis verify if the EGT3 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT3 output reistance - EGT3 output resistance old|	> 10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical faults on EGT3 sensorin and logic	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGT_ExhGas3_TFTKO and with EGT_ExhGas3_FA	20 fail samples out of 40 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Differential Pressure Too Low - (SW 18.19 and beyond)	P244A	This diagnostic detects a DPF pressure sensor pipe disconnected or clogged or blocked or a removed Diesel Particulate Filter	measured DPF absolute pressure	< **Exhaust Gas Pressure Too Low Threshold**	Test enabled by calibration (TRUE--> enable FALSE --> disable) No error on relative to ambient pressure sensor (electrical, rationality and offset) No error on upstream DPF temperature sensor (electrical and rationality) No error on air flow meter No error on atmospheric pressure sensor Exhaust gas volume flow Engine speed (Engine coolant temperature OR OBD Coolant Enable Criteria)	1.00 EGP_DiffPresSnsrRatFlt EGT_SnsrDPF_UpFlt MAF_MAF_SnsrFA OR MAF_MAF_SnsrTFTKO AmbPresDfltdStatus= CeAAPR_e_AmbPresNotDfltd > 50.00 l/s > 1,250.00 rpm > 40.00 °C OR = TRUE)	80.00 failures over 160.00 samples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst Temperature Too Low During Regeneration	P244C	This diagnosis detects an Injector or a catalyst that is malfunctioning or losses in the exhaust gas system	The DTC is set when: Counter of subsequent Interrupted regeneration The interrupted regeneration counter increases only when the interruption has caused by: - Regeneration process interrupted due to maximum regeneration time elapsed. Maximum time allowed to complete DPF regeneration expired (according to regeneration mission profile) OR - Post injection pulses not enabled in time.Time to release POST injection is expired (according to regeneration mission profile) OR - Regeneration Steady phase not entered in time Time to reach DPF regeneration steady state condition is expired (according to regeneration mission profile) The counter is reset when	> 0.00 > **Maximum allowed time to complete regeneration** > **Maximum allowed time to release post injections for regeneration** > **Maximum allowed time to reach steady state for regeneration**	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	No debounce function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			a successful DPF regeneration occurs					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate filter pressure sensor offset monitoring	P2452	This diagnosis verify if the pressure at the DPF inlet measured at the beginning of the driving cycle (when engine is not running), is too big (sensor offset too big)	|Average DPF pressure @beginning of driving cycle|	2 [%]	Test enabled by calibration and with key on and with minimum engine-off time and with Minimum engine not No fault on engine off Timer and with No fault on exhaust gas pressure sensor (electrical, quick change and stuck in range in and logic)	1 [Boolean] ==TRUE > 10.00 [sec] > 0.02 [sec] **EMD_EngModeNotRunTmErr** EGP_DiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresSnsrRatFlt	No debounce Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate filter pressure sensor plausibility monitoring	P2453	Case1: This diagnosis verify if the current value of the flow resistace is almost equal to the average value of the flow resistance Case2: This diagnosis verify if the pressure at the DPF inlet doesn't change when it is supposed to change (when moving from one engine operating point to another)	|Flow resistance filtered – Average flow resistance|>	> 0.15 [KPa*s/m^3]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No fault on exhaust gas pressure sensor (electrical, offset, quick change and stuck in range in and logic) and with No fault on air flow meter in and logic and with No fault on DPF Upstream temperature	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent MAF_SensorFA and with MAF_SensorTFTKO EGT_SnsrDPF_UpFA and with	40 fail samples out of 50 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor (electrical, rationality, quick change and stuck in range in and logic) and with **System in stationary conditions:** - Fuel request and with - Engine speed and with - Air mass quantity per cylinder and with - Air mass quantity per cylinder and with - Deactivation of Flow resistance calculation	EGT_SnsrDPF_UpTFTKO <= 1.00 [mm^3] <= 10.00 [rpm] <= 10.00 [mg] > 0.00 [mg] == FALSE		
			DPF pressure variation	<= 0.05 [%]	Test enabled by calibration and with Engine running and with No fault on exhaust gas pressure sensor (electrical, plausibility,	1 == TRUE EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt	10 fail samples out of 15 samples Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					offset and quick change in and logic) and with Engine speed variation greater and with Fuel quantity variation greater	and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent > 0.50 [rpm/s] > 0.02 [l/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate filter pressure sensor out of range monitoring Low	P2454	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal s 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.	< 3.00 [%]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	80 fail samples out of 160 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate filter pressure sensor out of range monitoring High	P2455	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal 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. Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	80 fail samples out of 160 samples Function task: 12.5 ms	Type B, 2 Trips
			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.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	80 fail samples out of 160 samples Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate filter pressure sensor quick change monitoring	P2456	This diagnosis verify if the signal (difference between two consecutive signal samples) variation is too big	|DPF pressure raw signal - DPFpressure raw signal old|	> 20.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical fault on exhaust gas pressure sensor	1 [Boolean] == TRUE == FALSE == TRUE > 11.00 [V] EGP_DiffPresSnsrCktFlt	80 fail samples out of 160 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooling System Performance (OBDII market only) (MDE applications)	P2457	This monitor checks the HP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	HP EGR Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. HP EGR Cooler efficiency is computed as the ratio between (HP EGR cooler upstream temperature - HP EGR cooler downstream temperature) and (HP EGR cooler upstream temperature - Engine coolant temperature). The Engine coolant temperature used is coming from the HP EGR cooler inlet coolant temperature sensor.	< 80.00 [%]	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet PT Relay voltage in range Engine is running or cranking HP EGR cooler upstream temperature in range Ambient Temperature Ambient pressure Air Control is Active Engine Coolant Temperature in range HP EGR Cooler bypass not active for a time HP EGR flow in range	1.00 ==TRUE ==TRUE Powertrain relay voltage > 11.00 [V] ==TRUE > 260.00 [°C] < 475.00 [°C] >= -7.00 [°C] >= 74.80 [kPa] Refer to "Air Control Active" Free Form > 60.00 [°C] < 124.00 [°C] > 15.00 [s] < 7.00 [mg/s] > 4.00 [mg/s]	Test executed after 250.00 samples are collected and their average is computed functional task 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	>= 3.00 [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	< 1,950.00 [rpm] > 1,250.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		
					No fault on HP EGR cooler downstream temperature sensor	CET_DNSS_FA==FALSE		
					No fault on Ambient Temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on HP EGR cooler inlet coolant temperature sensor	CEW_TempSnsrInFA ==FALSE		
					No fault on engine speed	CrankSensor_FA ==FALSE		
					No fault on HP EGR Cooler Bypass	CEB_ActrCktLoFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Regeneration Frequency (Nominal Engine Out Soot Model and Configurable Correction Block used	P2459	This diagnosis detects a too high DPF regeneration frequence due to a dirty combustion or a leak in the exhaust or in the intake line or a not efficient DPF.	Ratio between Soot Model based on Delta Pressure measure + Configurable Correction Block and Engine Out Soot Model AND (few kilometers spent after the previous regeneration AND few time spent after the previous regeneration AND few fuel consumed after the previous regeneration	>= 18.00	Test enabled by calibration (TRUE--> enable FALSE --> disable) Nominal Engine Out Soot Model is used, i.e. Configurable Correction Block is used, i.e. At least one successful regeneration occurs ∆p model is always valid before start of regeneration for a time The Nominal Engine out soot model shall be valid for a time Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time Ignition voltage in range Successful Regeneration shall be made in the previous regeneration Regeneration starts No Transient driving cycle is present, i.e. the delta fuel request during the soot loading time is	1.00 1.00 = 1 (true) 1.00 = 1 (true) >= 0.00 s > 0.50 % of the soot loading time > 0.50 % of the soot loading time 999,999.00 mm3/s	No debounce function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DPF regeneration is not requested at service. (Soot percentage evaluated by Δp model plus Configurable Correction Block (CCB) OR Many kilometers spent after the previous regeneration OR lots of time spent after the previous regeneration OR many fuel consumed after the previous regeneration)	> 50.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit (ECB Vacuum)	P245A	This monitor checks if the HP EGR cooler bypass valve command is in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in COOLING mode Shared High Side driver driven closed Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status Key ON or engine running	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Low (ECB Vacuum)	P245C	This monitor checks if the HP EGR cooler bypass valve command is shorted to ground	Resistance to ground lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in COOLING mode Shared High Side driver driven closed Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status Key ON or engine running	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit High (ECB Vacuum)	P245D	This monitor checks if the HP EGR cooler bypass valve command is shorted to power supply	Resistance to supply lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in BYPASS mode Shared High Side driver driven closed Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status Key ON or engine running	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Soot Accumulation - (SW 18.19 and beyond)	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 133.00	Test enabled by calibration (TRUE--> enable FALSE --> disable) No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality) No fault on air flow meter No fault on atmospheric pressure sensor DPF status insootloading phase (no regeneration ongoing) Engine speed No fault on exhaust mass flow estimation Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	1.00 EGP_DiffPresSnsrFlt EGT_SnsrDPF_UpFlt MAF_MAF_SnsrFAOR MAF_MAF_SnsrTFTKO AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd DPF_DPF_St== CeDPFR_e_SootLoading > 500.00 [rpm] EXF_TotExhDPF_UpFA > 24.00 [l/s] for > 2.00 [s] 0.00 [DegC] < Temperature < 600.00 [DegC] for > 0.00 [s]	120.00 failures over 150.00 samples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Coolant Temperature Ambient Temperature Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time Soot model based on Delta Pressure is always valid for a time Distance since last completed regeneration	> 0.00 [DegC] > -40.00 [DegC] > = 0.00 % of the soot loading >= 5.00 s > 0.00 km		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Stuck (ECB Vacuum)	P24A5	This monitor check if the HP EGR Cooler Bypass is mechanically stuck in bypass or cooling mode.	Gradient temperature downstream HP EGR cooler bypass when the HP EGR cooler bypass flap is moved from cooling to bypass and from bypass to cooling position < low threshold. Each of those phases is averaged over a calibration number of samples (see the "Time Required" column)	< **P24A5: Gradient Temperature Threshold** [°C]	Diagnosis is enabled by calibration	== 1.00	Test is executed after 5.00 + 5.00 + 5.00 sample counts Function task: 100 ms	Type B, 2 Trips
					Engine speed	>= 1,000.00 [rpm] < 3,000.00 [rpm]		
					Vehicle speed	>= 10.00 [kph] < 128.00 [kph]		
					Low-pass filtered HP EGR valve total flow	>= **P24A5: Minimum EGR flow** [mg/s] < **P24A5: Maximum EGR flow** [mg/s]		
					Air Control Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature	>= 60.00 [°C] < 124.00 [°C]		
					Combustion Mode selected by calibration	**P24A5: Combustion mode enabling table**		
					and active for a minimum time	> 20.00 [s]		
					Fuel request	>= 2.50 [mm^3] < 50.00 [mm^3]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel gradient	>= -20.00 [mm^3] < 20.00 [mm^3]		
					Gradient (absolute value) of filtered upstream HP EGR cooler temperature, with hysteresis	< 22.00 [°C/s] (ENABLE) > 24.00 [°C/s] (DISABLE)		
					Gradient (absolute value) of filtered engine speed, with hysteresis	< 299.00 [rpm/s] (ENABLE) > 300.00 [rpm/s] (DISABLE)		
					Gradient (absolute value) of filtered vehicle speed, with hysteresis	< 950.00 [m/s^2] (ENABLE) > 1,000.00 [m/s^2] (DISABLE)		
					Gradient (absolute value) of filtered HP EGR flow, with hysteresis	< 6.50 [g/s^2] (ENABLE) > 7.00 [g/s^2] (DISABLE)		
					HP EGR cooler upstream temperature	>= **P24A5: Minimum upstream EGR temperature** [°C] < **P24A5: Maximum upstream EGR temperature** [°C]		
					Outside air temperature			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR cooler bypass valve position is steady for a minimum time	>= -9.00 [°C] > 4.55 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)	== TRUE		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA=FALSE		
					No faults detected on downstream HP EGR Cooler temperature sensor	CET_DNSS_FA==FALSE		
					No faults detected on upstream HP EGR Cooler temperature sensor	CET_UPSS_FA==FALSE		
					No faults detected on HP EGR Cooler Bypass actuator	CEB_ActrCktFA==FALSE		
					No faults detected on HP EGR valve	EGR_PstnDvtnFA ==FALSE		
					No faults detected on Outside air temperature sensor			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Sensor Electrode raw current 1 AND Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	< 2.00 A < 0.09 A	Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Fault not active on undervoltage for Soot Sensor Control Unit supply No Electrical faults present on Soot Sensor Soot Sensor is in regeneration phase Soot Sensor temperature Soot Sensor Electrode current measurement enabled	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_EleclFault) 350.00 < T < 820.00 °C	No time debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Circuit High	P24B1	This diagnosis detects a short to power the soot sensor electrode signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage (measured ADC voltage for electrode current)	> 4.1 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply Soot sensor is not in regeneration status	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 15.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Heater Control Circuit/Open	P24B3	This diagnosis detects an open circuit on the soot sensor heater line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Heater current	I < 0.5 A OR I > 15 A	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle No Heater failures detected in the Sensor Control Unit ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 0 % > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Heater Control Circuit Low	P24B5	This diagnosis detects a short to ground on the soot sensor heater line	Diagnosis executed in Sensor Control Unit: Soot Sensor Heater current	I < 0.5 A OR I > 15 A	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle No Soot Sensor Heater failures detected in the Sensor Control Unit ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 0 % > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Heater Control Circuit High	P24B6	This diagnosis detects a short to power on the soot sensor heater line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Heater current OR Soot Sensor Heater switch output (off state) OR Soot Sensor Heater switch input (off state)	 > 0.2 A = 1 (for one of the last 5 measurements) = 1 (for one of the last 5 measurements)	Soot Sensor Control Unit conditions: Soot Sensor Heater Off ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 7.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Matter Sensor Temperature Circuit Performance	P24C7	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit.	The absolute value of the difference between the Soot Sensor Electrode and the electrode temperature model	> 150.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor Soot Sensor heater is not commanded Soot Sensor is in measurement operating status Exhaust gas temperature model is valid	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_EleclFault) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd	Time counter: 200.00 failures out of 250.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas temperature model is reliable, i.e.: (Ambient air pressure Ambient air temperature Exhaust gas volumetric flow at soot sensor Time after sensor regeneration Soot Sensor Dew Point has been reached) Temperature estimated by the sensor probe temperature model	 > 74.80 kPa > -12.00 °C > 30.00 mg/s > 120.00 s > 0.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Supply Voltage Circuit Low	P24D0	This diagnosis detects a short to ground of the soot sensor voltage supply line	Soot Sensor Control Unit supply voltage	< 9.00 V	Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode (The sensor is in regeneration phase OR the time from a regeneration request)	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 80.00	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Regeneration Incomplete	P24D1	This diagnosis detects a degradation of the soot sensor heater	the Soot Sensor Electrode Temperature is during the steady state soot sensor regeneration, for a consecutively time	<= (785.00 - 10.00)°C >= 43.00 s	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Volumetric flow estimation is valid The power ratio timer the power ratio timer increments during the steady state of soot sensor regeneration, when the ratio between power demand and power available is (Soot sensor transitioned from regeneration to measurement status OR	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) SOT_TotExhSootSnsrVld AND SOT_ExhTempSootSnsrVld AND SOT_ExhPresSootSnsrVld < 5.00 s 0.00 <= r <= 1.00	no debouncing time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the time of soot sensor steady state regeneration is)	>= 150.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position Sensor Circuit Low (analog position sensor)	P2564	This monitor checks if the VGT analog position sensor is out of electrical range low	analog position raw voltage < low threshold	< 5.00 [%]	Test enabled by calibration System out of the cranking phase Run Crank relay supply voltage in range Run crank active	== 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position Sensor Circuit High (analog position sensor)	P2565	This monitor checks if the VGT analog position sensor is out of electrical range high	analog position raw voltage > high threshold	> 95.00 [%]	Test enabled by calibration System out of the cranking phase Run Crank relay supply voltage in range Run crank active	== 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Stuck Closed (VGT Vacuum)	P2599	This monitor detects the VGT vanes mechanically stuck in a certain position different from their defaulted position (fully open) when the actuator is no longer driven (missing defaulted position)	Measured VGT position > maximum threshold	> 15.00 [%]	P0046 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	 > 4.00 [s] VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 1 (SCR: NOx Sensor Downstream Turbine)	P2627	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	< -8.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE refer to supporting table **KaOXYD_b_NOx1SigRn** (**gEnblCmbMode**) NOX_Snsr1_NotVld	Time counter: 200 failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 1 (SCR: NOx Sensor Downstream Turbine)	P2628	This DTC detects if O2 signal is higher than physical maximum value.	O2 signal higher than a maximum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE < 300.00 [kPa] < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt (MAP_SensorFA AND MAP_SensorTFTKO)	Time counter: 200 failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injector Calibration Not Learned/ Programmed	P268A	This DTC detects if the SQL (Small Quantity Learning) strategy has not been performed at end of line. The diagnostic shall report test pass if the SQL procedure has been succesfully executed and the learnt values have been stored in NVM, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	SQL procedure not executed at End Of Line procedure	SQL_Performed	Ignition ON SQL procedure not executed Manufacturer Enable Counter (MEC) == 0		N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injector Data Incompatible	P268C	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 1 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 1 EIA code not written via DID (DID $60).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	1.00 [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 Illum.
Cylinder 2 Injector Data Incompatible	P268D	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 2 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 2 EIA code not written via DID (DID $61).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	1.00 [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 Illum.
Cylinder 3 Injector Data Incompatible	P268E	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 3 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 3 EIA code not written via DID (DID $62).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [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 Illum.
Cylinder 4 Injector Data Incompatible	P268F	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 4 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 4 EIA code not written via DID (DID $63).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [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 Illum.
Cylinder 5 Injector Data Incompatible	P2690	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 5 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 5 EIA code not written via DID (DID $64).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [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 Illum.
Cylinder 6 Injector Data Incompatible	P2691	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 6 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 6 EIA code not written via DID (DID $65).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [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 Illum.
Cylinder 7 Injector Data Incompatible	P2692	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 7 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 7 EIA code not written via DID (DID $66).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	1.00 [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 Illum.
Cylinder 8 Injector Data Incompatible	P2693	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 8 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 8 EIA code not written via DID (DID $67).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [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 Illum.
O2S Circuit Range/ Performance Bank 1 Sensor 1 (SCR: NOx Sensor Downstream Turbine)	P2A00	This DTC aims to detect a drift of measured O2 value (A) from an estimated concentration (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 6.00 [%] < -6.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode (No After injection release AND Boolean Flag used to enable After injection status is TRUE) Engine coolant temperature measure in range No pending or confirmed DTCs	 > 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**) 1 [boolean] > 0.00 [°C] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowFA	Once per trip Note: if EWMA Fast Initial Response is active OR EWMA Rapid Response is active than 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 Illum.
						LPE_PstnShtOffReqFA (ECT_Sensor_FA AND ECT_Sensor_TFTKO)		
					Stable fuel load condition has been reached i.e. following conditions are met for a calibrateable time: a. Engine speed in operating range b. EGR mass flow c. LPE position e. Injected fuel quantity in operating range f. Air mass per cylinder in operating range g. Estimated O2 concentration in range Estimated O2 concentration stable i.e. difference between initial and actual value Air mass flown since fuel cut-off condition	> 2.00 [s] > 1,100 [rpm] < 3,000 [rpm] < 1,000.00 [mg] < 0.00 [%] > 30.00 [mm^3] < 60.00 [mm^3] > 500.00 [mg] < 1,500.00 [mg] < 21.00 [%] > 0.00 [%] < 3.00 [%] > 20.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Range/ Performance Bank 1 Sensor 2 (SCR: NOx Sensor Downstream Turbine)	P2A01	This DTC aims to detect a drift of Sensor 2 O2 measured value (A) from Sensor 1 O2 measured value (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 0.00 [%] < 0.00 [%]	Engine running System voltage in range Sensor is fully operative Sensor 1 is fully operative No pending or confirmed DTCs DTC P2A00 is running Air mass flown since P2A00 is enabled	 > 11.00 [V] OXY_O2_NOx2_PresCmpNotRlb == FALSE OXY_O2_NOx1_PresCmpNotRlb == FALSE NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO) (see P2A00 Fault code) > 0.00 [g]	EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips

Initial Supporting table - Down Stream Stk Temp Vrtn

Description: Minimum temperature movement required to pass the stuck diagnostic.

Value Units: Minimum temperature movement (degC)
X Unit: Downstream Temp sensor temp (degC)

y/x	-40	0	20	40	60	80	100	120
1	3	4	5	5	5	4	3	2

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_EffRgnHysHi

Description:

y/x	0	5	10	15	20	40	50	60	70	80	90	100	110	120	130
0	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
5	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
10	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
15	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
20	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
25	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
30	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
35	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
40	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
45	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
50	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
55	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
60	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
65	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
70	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
75	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
80	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
90	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
100	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	5	10	15	20	40	50	60	70	80	90	100	110	120	130
0	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
5	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
10	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
15	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
20	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
25	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
30	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
35	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
40	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
45	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
50	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
55	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
60	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
65	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
70	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
75	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
80	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
90	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
100	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535

Initial Supporting table - DPF_ResistFlowDsblHi

Description:

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	30	58	61	61	61	55	50	40

Initial Supporting table - DPF_ResistFlowDsblLo

Description:

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	20	18	16	14	12	10	8	6

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	0	20	40	60	80	100	120	140
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:								
y/x	1,000	1,100	1,500	2,500	2,750	3,500	4,000	5,000
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:								
y/x	1,000	1,100	1,500	2,500	2,750	3,500	4,000	5,000
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - EGT_FuelReqMaxThreshold

Description:

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

Initial Supporting table - EGT_FuelReqMinThrsh

Description:

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

Initial Supporting table - EGT1 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT1 Dynamic Check.

y/x	0.0	5.0	10.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT2 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT2 Dynamic Check.

y/x	0.0	5.0	10.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT3 Dynamic Check.

y/x	0.0	5.0	10.0	40.0	60.0	80.0	120.0
800.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	244,536	219,896	196,560	171,760	157,872	143,992	130,112	115,112

Initial Supporting table - EGT3 Stuck Wait Time

Description:

y/x	-40	0	50	100	140	159	160	180
1	728	650	553	456	378	341	32,768	32,768

Initial Supporting table - EGT3 Stuck Temperature Variation

Description:

y/x	-40	0	50	100	140	159	160	180
1	200	160	110	60	20	1	0	0

Initial Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

y/x	750	1,000	1,500	2,000	2,500	3,000	4,000	5,000
1	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
6	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1

Initial Supporting table - Inrush_current_profile

Description: This table shows the Inrush current profile to detect a ground short condition

y/x	1	2
1	Time [s]	Irms [A]
2	0	0
3	0	65
4	0	50
5	0	45
6	0	42
7	0	38
8	1	35
9	1	33
10	1	32
11	1	31
12	1	31
13	1	30
14	1	29
15	1	28
16	1	26
17	1	25
18	2	24
19	2	23
20	2	23
21	2	22
22	2	22
23	2	21
24	2	21
25	2	21
26	2	21
27	2	21
28	3	21
29	3	20
30	3	20
31	3	20
32	3	20
33	3	20
34	3	20
35	3	20

Initial Supporting table - Inrush_current_profile

36	3	20
37	3	20
38	4	20
39	4	20
40	4	20
41	4	20
42	4	20
43	4	20
44	4	20
45	4	20
46	4	20
47	4	20
48	5	20
49	5	20
50	5	20
51	5	20
52	5	20
53	5	20
54	6	15
55	7	13
56	8	13
57	9	13
58	10	13
59	11	13
60	12	13
61	13	13
62	14	13
63	15	13
64	16	13
65	17	13
66	18	13
67	20	13

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	1

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	0	1	1	

Initial Supporting table - KaFADC_b_SQC_CWA_EnblLink

Description: Engine speed ranges to be learned with CWA before give a positive report to Zero Torque Coordinator.

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

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh2

Description: Threshold 2 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm]

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh2 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1											
y/x	0	1	2	3	4	5	6	7	8	9	10
1	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2											
y/x	11	12	13	14	15	16	17	18	19	20	
1	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1				
y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2				
y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3				
y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: Mpa

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

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	182	113	79	66	0

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-106	-106	-106	-106	0

Initial Supporting table - KaOXYD_b_NOx1LoadChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Full Load condition is enabled

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 1				
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	0	0	0
KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2				
y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	0
KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3				
y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	0	0	0	0
KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4				
y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0
KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5				
y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Overrun condition is enabled

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1				
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	0	0	0
KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2				
y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	0
KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3				
y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	0	0	0	0
KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4				
y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0
KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5				
y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1				
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	0	0	0
KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2				
y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	0
KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3				
y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	0	0	0	0
KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4				
y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0
KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5				
y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	300	300	300	300	300

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000
1	20	20	30	40	48	68	68	68	68	45	35	25

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	10	15	20	25	30	35	40	45	50	60
1,000	11	11	11	11	12	12	13	14	15	17
1,250	11	11	11	11	12	12	13	14	15	17
1,500	11	11	11	11	12	12	13	14	15	17
1,750	11	11	11	11	12	12	13	14	15	17
2,000	11	11	11	11	12	12	13	14	15	17
2,250	11	11	11	11	12	12	13	14	15	17
2,500	11	11	11	11	12	12	13	14	15	17
2,750	11	11	11	11	12	12	13	14	15	17
3,000	11	11	11	11	12	12	13	14	15	17
3,250	11	11	11	11	12	12	13	14	15	17

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	10	15	20	25	30	35	40	45	50	60
1,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,500	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,750	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,500	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,750	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
3,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
3,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	60	60	60	60	60	60	60	60	60	60

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,500	1,750	2,000	2,250	2,500
1	130	136	142	149	155

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-90	-80	-41	-40	-20	0	40	55	56	60	80
-90	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-49	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
67	0	0	0	100	100	100	100	100	0	0	0
68	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KtGLOD_U_VoltLoDelMax(KnGLOD_I_GP_Curr)

Description: Maximum delta voltage table data for low rationality error check.

y/x	0	4	8	12	16	20	24	28
1	5	5	5	5	5	5	5	5

Initial Supporting table - NOX_NOx2SelfTstEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor selt-test monitoring

NOX_NOx2SelfTstEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

NOX_S1_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OOR high monitor

NOX_S1_OutRngMaxCmbMode - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S1_OutRngMaxCmbMode - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OOR low monitor

NOX_S1_OutRngMinCmbMode - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_OutRngMinCmbMode - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S1_OutRngMinCmbMode - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_OutRngMinCmbMode - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor stability monitor

NOX_S1_StBitChkEnblCmbMode - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S1_StBitChkEnblCmbMode - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OOR high monitor

NOX_S2_OutRngMaxCmbMode - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S2_OutRngMaxCmbMode - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OOR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S2_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S2_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S2_StBitChkEnblCmbMode - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0106, P2227, P227B, P00C7: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured air flow.

Value Units: kPa
X Unit: g/s

y/x	3	10	15	20	25	30	35	40
1	20	30	35	35	40	40	45	45

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck diagnostic.

Value Units: Minimum temperature movement (degC)
X Unit: Upstream Temp sensor temp (degC)

y/x	-40	0	20	40	60	80	100	120
1	3	4	5	5	5	4	3	2

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	140	12	8	5	5	5

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	140	12	8	5	5	5

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	137	9	5	2	2	2

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	137	9	5	2	2	2

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,500	4,000
1	12	17	17	18	18	30	35	35

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,500	4,000
1	12	17	17	18	18	30	35	35

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000
1	10	14	14	15	15	28	32	32

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000
1	10	14	14	15	15	28	32	32

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for C2

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	35	35	35	35	35	30	25	20	20	20	20	15	5

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF high O2, Rich idle and all HC modes and SCR service warm up. It is function of engine speed).

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	25	15	10	8	8	8	8	8	8	8	8	8	8

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF low O2. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	25	15	10	8	8	8	8	8	8	8	8	8	8

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	20	18	16	13	10	10	10	10	10	10	10	10	10

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in SCR temp 1 or DeSOx lean mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	20	18	16	14	13	10	10	10	10	10	10	10	10

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 3 or DeNOx mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V2

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 2 or DeSOx Rich mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

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

Initial Supporting table - CatCrtdEffRepEWMA

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Catalyst EWMA filter enabled and Catalyst conversion inefficiency previously detected (Catalyst FA = TRUE)

y/x	250	266	282	298	314	330
1	0	0	0	0	0	0

Initial Supporting table - CatCrtdEffThrsh

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (fault threshold) as function of ambient temperature [K]

y/x	250	266	282	298	314	330
1	0	0	0	0	0	0

Initial Supporting table - CatCrtdMaxFuel

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

y/x	250	266	282	298	314	330
1	20	20	20	20	20	20

Initial Supporting table - K_EffExhFlowCond

Description: Enablement table, function of exhaust flow and SCR average temperature [boolean] for SCR NOx catalyst efficiency monitoring (P20EE)

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

y/x	150	210	220	240	250	265	300	325	326	375	376	425	450	475	500
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
40	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
50	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
60	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
70	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
80	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
90	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
100	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KtFADD_V_CB_MaxAuthMaxFuelReq

Description: High fuel request map threshold (engine speed dependent) to enable CB maximum authority diagnostic check.

y/x	1	2	3	4	5	6	7	8	9	10	11	12
1	256	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - m_NH3_StrgDevErrMaxThrsh

Description: Upper boundary of NH3 storage deviation error [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMinThrsh

Description: Lower boundary of NH3 storage deviation error [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgMaxThrsh

Description: Upper boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	3	3	3	3	3	3	3	3

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	2	2	2	2	2	2	2	2

Initial Supporting table - m_SlipNOxIntglThrsh

Description: NOx integral threshold to enable slip condition based on SCR average temperature [mg] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: mg
X Unit: °C

y/x	250	300	350	425
1	8,192	8,192	8,192	8,192

Initial Supporting table - P0101: MAF performance enabling

Description: Calibration map for the enabling of MAF sensor performance monitoring, function of combustion mode.

Value Units: boolean
X Unit: enum

P0101: MAF performance enabling - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P0101: MAF performance enabling - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

P0101: MAF performance enabling - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0101: MAF performance enabling - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0101: Manifold pressure High limit in Overrun

Description: Intake manifold pressure high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	730	1,000	1,500	2,000	2,500	3,000	3,500	4,200
1	255	255	255	255	255	255	255	255

Initial Supporting table - P0101: Manifold pressure Low limit in Overrun

Description: Intake manifold pressure low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	730	1,000	1,500	2,000	2,500	3,000	3,500	4,200
1	74	74	74	74	74	74	74	74

Initial Supporting table - P0101: Pulsation Map

Description: Adjustment of the air mass flow measured by the MAF sensor for flow distribution and pulsations. It is function of engine speed (X axis) and fuel request (Y axis)

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

y/x	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	3,750	4,000	4,250	4,500	5,000
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0101: VGT position High limit in Overrun

Description: VGT position high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	730	1,000	1,500	2,000	2,500	3,000	3,500	4,200
1	95	95	95	95	95	95	95	95

Initial Supporting table - P0101: VGT position Low limit in Overrun

Description: VGT position low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	730	1,000	1,500	2,000	2,500	3,000	3,500	4,200
1	15	15	15	15	15	15	15	15

Initial Supporting table - P0234, P0299: Boost pressure control deviation enabling

Description: Calibration map for the enabling of boost pressure control deviation monitoring, function of combustion mode.

Value Units: boolean

P0234, P0299: Boost pressure control deviation enabling - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0234, P2263: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

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

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	176	180	160	160

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	130	130	100	100

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
1,749	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,750	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,999	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,500	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,001	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,500	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
5,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
1,749	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,750	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,999	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,500	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,001	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,500	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
5,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,749	1,750	1,999	2,000	2,500	3,000	3,001	4,000	4,500	5,000
1	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0299, P2263: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

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

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	250	250	250	250

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	140	140	150	150

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	129	130	140	150	160	170	180	190	200	210	220	230	240	250	251
1,199	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,200	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,300	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,400	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,500	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,600	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,800	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2,000	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2,200	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2,201	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	129	130	140	150	160	170	180	190	200	210	220	230	240	250	251
1,199	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,200	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,300	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,400	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,500	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,600	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,800	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
2,000	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
2,200	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
2,201	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,199	1,200	1,300	1,400	1,500	1,600	1,800	2,000	2,200	2,201
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0401, P0402: EGR flow monitor enabling

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

Value Units: boolean
X Unit: enum

P0401, P0402: EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0401, P0402: EGR intrusive test enabling

Description: Calibration map to choose if the EGR intrusive test is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0401, P0402: EGR intrusive test enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

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

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

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

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

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

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024
8	-1,024	-64	-64	-64	-64	-64	-64	-1,024
10	-1,024	-64	-64	-64	-64	-64	-64	-1,024
15	-1,024	-64	-64	-64	-64	-64	-64	-1,024
20	-1,024	-64	-64	-64	-64	-64	-64	-1,024
25	-1,024	-64	-64	-64	-64	-64	-64	-1,024
35	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024
8	-1,024	-64	-64	-64	-64	-64	-64	-1,024
10	-1,024	-64	-64	-64	-64	-64	-64	-1,024
15	-1,024	-64	-64	-64	-64	-64	-64	-1,024
20	-1,024	-64	-64	-64	-64	-64	-64	-1,024
25	-1,024	-64	-64	-64	-64	-64	-64	-1,024
35	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024
8	-1,024	-64	-64	-64	-64	-64	-64	-1,024
10	-1,024	-64	-64	-64	-64	-64	-64	-1,024
15	-1,024	-64	-64	-64	-64	-64	-64	-1,024
20	-1,024	-64	-64	-64	-64	-64	-64	-1,024
25	-1,024	-64	-64	-64	-64	-64	-64	-1,024
35	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024

Initial Supporting table - P0401: Insufficient EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
74	45	45	45	45	45	45	45	45
75	45	45	45	45	45	45	45	45
78	45	45	45	45	45	45	45	45
80	45	45	45	45	45	45	45	45
83	45	45	45	45	45	45	45	45
85	45	45	45	45	45	45	45	45
88	45	45	45	45	45	45	45	45
91	45	45	45	45	45	45	45	45
94	45	45	45	45	45	45	45	45
97	45	45	45	45	45	45	45	45
100	45	45	45	45	45	45	45	45

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0401: Insufficient EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
74	8	8	8	8	8	8	8	8
75	8	8	8	8	8	8	8	8
78	8	8	8	8	8	8	8	8
80	8	8	8	8	8	8	8	8
83	8	8	8	8	8	8	8	8
85	8	8	8	8	8	8	8	8
88	8	8	8	8	8	8	8	8
91	8	8	8	8	8	8	8	8
94	8	8	8	8	8	8	8	8
97	8	8	8	8	8	8	8	8
100	8	8	8	8	8	8	8	8

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0401: Insufficient EGR intrusive test Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR intrusive test Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Minimum desired EGR flow

Description: Minimum desired EGR flow above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
74	1,020	104	104	104	104	104	104	1,020
75	1,020	104	104	104	104	104	104	1,020
78	1,020	104	104	104	104	104	104	1,020
80	1,020	104	104	104	104	104	104	1,020
83	1,020	100	100	100	100	100	100	1,020
85	1,020	100	100	100	100	100	100	1,020
88	1,020	100	100	100	100	100	100	1,020
91	1,020	100	100	100	100	100	100	1,020
94	1,020	100	100	100	100	100	100	1,020
97	1,020	100	100	100	100	100	100	1,020
100	1,020	100	100	100	100	100	100	1,020

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for all others combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-225.0	-225.0	-225.0	-225.0	-225.0
2,000.0	-225.0	-225.0	-225.0	-225.0	-225.0
3,000.0	-225.0	-225.0	-225.0	-225.0	-225.0
4,000.0	-225.0	-225.0	-225.0	-225.0	-225.0
5,000.0	-225.0	-225.0	-225.0	-225.0	-225.0
6,000.0	-225.0	-225.0	-225.0	-225.0	-225.0
7,000.0	-300.0	-300.0	-300.0	-300.0	-300.0

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	225.0	225.0	225.0	225.0	225.0
2,000.0	225.0	225.0	225.0	225.0	225.0
3,000.0	225.0	225.0	225.0	225.0	225.0
4,000.0	225.0	225.0	225.0	225.0	225.0
5,000.0	225.0	225.0	225.0	225.0	225.0
6,000.0	225.0	225.0	225.0	225.0	225.0
7,000.0	300.0	300.0	300.0	300.0	300.0

Initial Supporting table - P140B, P140C: EGR slow response enabling

Description: Calibration map for the enabling of EGR slow response monitoring, function of combustion mode.

Value Units: boolean

P140B, P140C: EGR slow response enabling - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P140B: Increasing EGR slow response threshold

Description: Threshold for increasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	75	83	98
1	5	5	6

Initial Supporting table - P140C: Decreasing EGR slow response threshold

Description: Threshold for decreasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	75	83	98
1	6	6	6

Initial Supporting table - P16F3_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	10	15	20	30	50
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	10	15	20	30	50
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P2263: Boost pressure system performance monitor delay timer

Description: Delay timer before enabling the boost pressure system performance monitor once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	1	1	1	1	1	1	1

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	-20	-20	-20	-20	-20	-20	-20	-20
2,000	-20	-20	-20	-20	-20	-20	-20	-20
2,500	-20	-20	-20	-20	-20	-20	-20	-20
3,000	-20	-20	-20	-20	-20	-20	-20	-20
3,500	-20	-20	-20	-20	-20	-20	-20	-20
4,000	-20	-20	-20	-20	-20	-20	-20	-20
4,500	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control not active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	-30	-30	-30	-30	-30	-30	-30	-30
2,000	-20	-20	-20	-20	-20	-20	-20	-20
2,500	-20	-20	-20	-20	-20	-20	-20	-20
3,000	-20	-20	-20	-20	-20	-20	-20	-20
3,500	-20	-20	-20	-20	-20	-20	-20	-20
4,000	-20	-20	-20	-20	-20	-20	-20	-20
4,500	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	20	20	20	20	20	20	20	20
2,000	20	20	20	20	20	20	20	20
2,500	20	20	20	20	20	20	20	20
3,000	20	20	20	20	20	20	20	20
3,500	20	20	20	20	20	20	20	20
4,000	20	20	20	20	20	20	20	20
4,500	20	20	20	20	20	20	20	20

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control not active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	30	30	30	30	30	30	30	30
2,000	20	20	20	20	20	20	20	20
2,500	20	20	20	20	20	20	20	20
3,000	20	20	20	20	20	20	20	20
3,500	20	20	20	20	20	20	20	20
4,000	20	20	20	20	20	20	20	20
4,500	20	20	20	20	20	20	20	20

Initial Supporting table - P24A5: Combustion mode enabling table

Description: Enabling flag for the HP EGR Cooler Bypass Stuck diagnosis, function of combustion mode.

Value Units: boolean

P24A5: Combustion mode enabling table - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	0	0	0	0	0

P24A5: Combustion mode enabling table - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

P24A5: Combustion mode enabling table - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P24A5: Combustion mode enabling table - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P24A5: Gradient Temperature Threshold

Description: HP EGR Cooler Bypass Stuck diagnosis gradient temperature threshold map to be applied at HP EGR Cooler Bypass Stuck diagnosis. It is function of the HP EGR valve total flow.

Value Units: °C
X Unit: g/s

y/x	3	4	5	5	6	7	8	10
1	5	5	5	5	5	6	6	6

Initial Supporting table - P24A5: Maximum EGR flow

Description: Maximum HP EGR flow below which the HP EGR cooler bypass stuck monitoring is enabled. It is function of Ambient Temperature.

Value Units: g/s
X Unit: °C

y/x	-20	-14	-9	-5	0	5
1	30	30	30	30	30	30

Initial Supporting table - P24A5: Maximum upstream EGR temperature

Description: Maximum upstream HP EGR temperature below which the HP EGR cooler bypass stuck monitor is enabled. It is function of Ambient Temperature.

Value Units: °C
X Unit: °C

y/x	-20	-14	-9	-5	0	5
1	750	750	750	750	750	750

Initial Supporting table - P24A5: Minimum EGR flow

Description: Minimum HP EGR flow above which the HP EGR cooler bypass stuck monitoring is enabled. It is function of Ambient Temperature.

Value Units: g/s
X Unit: °C

y/x	-20	-14	-9	-5	0	5
1	6	5	5	4	4	4

Initial Supporting table - P24A5: Minimum upstream EGR temperature

Description: Minimum upstream HP EGR temperature above which the HP EGR cooler bypass stuck monitor is enabled. It is function of Ambient Temperature.

Value Units: °C
X Unit: °C

y/x	-20	-14	-9	-5	0	5
1	425	418	411	406	400	375

Initial Supporting table - P2635 Max Fuel Flow

Description: P2635 Maximum Fuel Flow Disable Criteria
Maximum allowed fuel flow values above which the diagnostic is disabled

Value Units: grams / second
X Unit: kilopascals [commanded fuel pressure]
Y Units: volts [device supply]

y/x	200	250	300	350	400	450	500	550	600
5	512	512	512	512	512	512	512	512	512
6	512	512	512	512	512	512	512	512	512
8	512	512	512	512	512	512	512	512	512
9	512	512	512	512	512	512	512	512	512
11	512	512	512	512	512	512	512	512	512
12	512	512	512	512	512	512	512	512	512
14	512	512	512	512	512	512	512	512	512
15	512	512	512	512	512	512	512	512	512
17	512	512	512	512	512	512	512	512	512
18	512	512	512	512	512	512	512	512	512
20	512	512	512	512	512	512	512	512	512
21	512	512	512	512	512	512	512	512	512
23	512	512	512	512	512	512	512	512	512
24	512	512	512	512	512	512	512	512	512
26	512	512	512	512	512	512	512	512	512
27	512	512	512	512	512	512	512	512	512
29	512	512	512	512	512	512	512	512	512

Initial Supporting table - P2635 Threshold High

Description: P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals
X Unit: kilopascals [commanded fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	40	40	40	40	40	40	40	40	40
2	40	40	40	40	40	40	40	40	40
3	40	40	40	40	40	40	40	40	40
6	40	40	40	40	40	40	40	40	40
6	40	40	40	40	40	40	40	40	40
8	40	40	40	40	40	40	40	40	40
9	40	40	40	40	40	40	40	40	40
11	40	40	40	40	40	40	40	40	40
12	40	40	40	40	40	40	40	40	40
14	40	40	40	40	40	40	40	40	40
15	40	40	40	40	40	40	40	40	40
17	40	40	40	40	40	40	40	40	40
18	40	40	40	40	40	40	40	40	40
20	40	40	40	40	40	40	40	40	40
21	40	40	40	40	40	40	40	40	40
23	40	40	40	40	40	40	40	40	40
24	40	40	40	40	40	40	40	40	40
26	40	40	40	40	40	40	40	40	40
27	40	40	40	40	40	40	40	40	40
29	40	40	40	40	40	40	40	40	40
30	40	40	40	40	40	40	40	40	40
32	40	40	40	40	40	40	40	40	40
33	40	40	40	40	40	40	40	40	40
35	40	40	40	40	40	40	40	40	40
36	40	40	40	40	40	40	40	40	40
38	40	40	40	40	40	40	40	40	40
39	40	40	40	40	40	40	40	40	40
41	40	40	40	40	40	40	40	40	40
42	40	40	40	40	40	40	40	40	40
44	40	40	40	40	40	40	40	40	40
45	40	40	40	40	40	40	40	40	40

Initial Supporting table - P2635 Threshold High

47	40	40	40	40	40	40	40	40	40
48	40	40	40	40	40	40	40	40	40

Initial Supporting table - P2635 Threshold Low

Description: P2635 Filtered Pressure Error Low Threshold [over-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals
X Unit: kilopascals [commanded fuel pressure]
Y Units: grams / second [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	-190	-190	-190	-190	-190	-190	-190	-190	-190
2	-190	-190	-190	-190	-190	-190	-190	-190	-190
3	-190	-190	-190	-190	-190	-190	-190	-190	-190
6	-190	-190	-190	-190	-190	-190	-190	-190	-190
6	-190	-190	-190	-190	-190	-190	-190	-190	-190
8	-190	-190	-190	-190	-190	-190	-190	-190	-190
9	-190	-190	-190	-190	-190	-190	-190	-190	-190
11	-190	-190	-190	-190	-190	-190	-190	-190	-190
12	-190	-190	-190	-190	-190	-190	-190	-190	-190
14	-190	-190	-190	-190	-190	-190	-190	-190	-190
15	-190	-190	-190	-190	-190	-190	-190	-190	-190
17	-190	-190	-190	-190	-190	-190	-190	-190	-190
18	-190	-190	-190	-190	-190	-190	-190	-190	-190
20	-190	-190	-190	-190	-190	-190	-190	-190	-190
21	-190	-190	-190	-190	-190	-190	-190	-190	-190
23	-190	-190	-190	-190	-190	-190	-190	-190	-190
24	-190	-190	-190	-190	-190	-190	-190	-190	-190
26	-190	-190	-190	-190	-190	-190	-190	-190	-190
27	-190	-190	-190	-190	-190	-190	-190	-190	-190
29	-190	-190	-190	-190	-190	-190	-190	-190	-190
30	-190	-190	-190	-190	-190	-190	-190	-190	-190
32	-190	-190	-190	-190	-190	-190	-190	-190	-190
33	-190	-190	-190	-190	-190	-190	-190	-190	-190
35	-190	-190	-190	-190	-190	-190	-190	-190	-190
36	-190	-190	-190	-190	-190	-190	-190	-190	-190
38	-190	-190	-190	-190	-190	-190	-190	-190	-190
39	-190	-190	-190	-190	-190	-190	-190	-190	-190
41	-190	-190	-190	-190	-190	-190	-190	-190	-190
42	-190	-190	-190	-190	-190	-190	-190	-190	-190
44	-190	-190	-190	-190	-190	-190	-190	-190	-190
45	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - P2635 Threshold Low

47	-190	-190	-190	-190	-190	-190	-190	-190	-190
48	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - t_DerTempDsblTmr

Description: Disabling timer based on the time derivative of SCR average temperature [sec] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: sec
X Unit: °C/sec

y/x	-10	-5	0	2	5	9	10	12
1	10	10	10	10	10	10	90	180

Initial Supporting table - T_MaxTempGrad

Description: Upper boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	25	25	25	25	25	25	25	25

Initial Supporting table - T_MinTempGrad

Description: Lower boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - t_NOxFlowIncDsblTmr

Description: Debounce time to wait after the NOx flow becomes in range [sec] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: sec
X Unit: mg/sec
Y Units: sec

y/x	5	15	30	45	60	90	120
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	140	12	8	5	5	5

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	140	12	8	5	5	5

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	137	9	5	2	2	2

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	137	9	5	2	2	2

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,500	4,000
1	12	17	17	18	18	30	35	35

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,500	4,000
1	12	17	17	18	18	30	35	35

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000
1	10	14	14	15	15	28	32	32

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,250	1,500	1,750	2,000	2,500	3,000	4,000
1	10	14	14	15	15	28	32	32

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for C2

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	35	35	35	35	35	30	25	20	20	20	20	15	5

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF high O2, Rich idle and all HC modes and SCR service warm up. It is function of engine speed).

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	25	15	10	8	8	8	8	8	8	8	8	8	8

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF low O2. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	25	15	10	8	8	8	8	8	8	8	8	8	8

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	20	18	16	13	10	10	10	10	10	10	10	10	10

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in SCR temp 1 or DeSOx lean mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	20	18	16	14	13	10	10	10	10	10	10	10	10

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 3 or DeNOx mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V2

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 2 or DeSOx Rich mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	4,000
1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

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

Initial Supporting table - KaFADR_e_FSA_CombModeEnblGrp

Description: Enable FSA learning based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeEnblGrp - Part 1				
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeEnblGrp - Part 2				
y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeEnblGrp - Part 3				
y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeEnblGrp - Part 4				
y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeEnblGrp - Part 5				
y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KaFADR_e_FSA_CombModeRelGrp

Description: Enable FSA correction release based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeRelGrp - Part 1				
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeRelGrp - Part 2				
y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeRelGrp - Part 3				
y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeRelGrp - Part 4				
y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_CombModeRelGrp - Part 5				
y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KaFADR_e_FSA_ECM_CombModeGrp

Description: Enable P026C and P026D in specific combustion modes and select related threshold maps based on calibrated group

Value Units: -
X Unit: -

KaFADR_e_FSA_ECM_CombModeGrp - Part 1				
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_ECM_CombModeGrp - Part 2				
y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_ECM_CombModeGrp - Part 3				
y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_ECM_CombModeGrp - Part 4				
y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd
KaFADR_e_FSA_ECM_CombModeGrp - Part 5				
y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

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

y/x	10	15	20	25	30	35	40	45	50	60
1,000	11	11	11	11	12	12	13	14	15	17
1,250	11	11	11	11	12	12	13	14	15	17
1,500	11	11	11	11	12	12	13	14	15	17
1,750	11	11	11	11	12	12	13	14	15	17
2,000	11	11	11	11	12	12	13	14	15	17
2,250	11	11	11	11	12	12	13	14	15	17
2,500	11	11	11	11	12	12	13	14	15	17
2,750	11	11	11	11	12	12	13	14	15	17
3,000	11	11	11	11	12	12	13	14	15	17
3,250	11	11	11	11	12	12	13	14	15	17

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

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

y/x	10	15	20	25	30	35	40	45	50	60
1,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,500	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,750	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,500	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,750	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
3,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
3,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtHi

Description: Curve of the weighting factor dependent on ambient pressure for P026D

Value Units: -
X Unit: kPa

y/x	72	83	96
1	1	1	1

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtLo

Description: Curve of the weighting factor dependent on ambient pressure for P026C

Value Units: -
X Unit: kPa

y/x	72	83	96
1	2	2	1

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp1

Description: Map to define P026D threshold for combustion mode Group 1

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

y/x	5	8	10	13	15	18	20	23	25	30
1,000	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9
2,000	9	9	9	9	9	9	9	9	9	9
2,200	9	9	9	9	9	9	9	9	9	9
2,400	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp2

Description: Map to define P026D threshold for combustion mode Group 2

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

y/x	5	8	10	13	15	18	20	23	25	30
1,000	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9
2,000	9	9	9	9	9	9	9	9	9	9
2,200	9	9	9	9	9	9	9	9	9	9
2,400	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp3

Description: Map to define P026D threshold for combustion mode Group 3

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

y/x	5	8	10	13	15	18	20	23	25	30
1,000	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9
2,000	9	9	9	9	9	9	9	9	9	9
2,200	9	9	9	9	9	9	9	9	9	9
2,400	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp1

Description: Map to define P026C threshold for combustion mode Group 1

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

y/x	5	8	10	13	15	18	20	23	25	30
1,000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp2

Description: Map to define P026C threshold for combustion mode Group 2

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

y/x	5	8	10	13	15	18	20	23	25	30
1,000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp3

Description: Map to define P026C threshold for combustion mode Group 3

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

y/x	5	8	10	13	15	18	20	23	25	30
1,000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
2,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - P0234, P0299: Boost pressure control deviation enabling

Description: Calibration map for the enabling of boost pressure control deviation monitoring, function of combustion mode.

Value Units: boolean

P0234, P0299: Boost pressure control deviation enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0234, P2263: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

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

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	176	180	160	160

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	130	130	100	100

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
1,749	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,750	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,999	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,500	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,001	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,500	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
5,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
1,749	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,750	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
1,999	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
2,500	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,000	-10	-10	-10	-10	-10	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
3,001	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
4,500	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
5,000	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,749	1,750	1,999	2,000	2,500	3,000	3,001	4,000	4,500	5,000
1	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0299, P2263: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

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

y/x	100	120	140	165	185	210	230	250	270	290	315	335	360	380	400
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	250	250	250	250

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	75	83	97	100
1	140	140	150	150

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	129	130	140	150	160	170	180	190	200	210	220	230	240	250	251
1,199	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,200	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,300	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,400	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,500	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,600	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,800	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2,000	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2,200	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2,201	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	129	130	140	150	160	170	180	190	200	210	220	230	240	250	251
1,199	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,200	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,300	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,400	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,500	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,600	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
1,800	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
2,000	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
2,200	127	24	27	30	32	35	38	40	43	45	45	45	45	45	127
2,201	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,199	1,200	1,300	1,400	1,500	1,600	1,800	2,000	2,200	2,201
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0401, P0402: EGR flow monitor enabling

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

Value Units: boolean
X Unit: enum

P0401, P0402: EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0401, P0402: EGR intrusive test enabling

Description: Calibration map to choose if the EGR intrusive test is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0401, P0402: EGR intrusive test enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

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

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

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

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

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

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024
8	-1,024	-64	-64	-64	-64	-64	-64	-1,024
10	-1,024	-64	-64	-64	-64	-64	-64	-1,024
15	-1,024	-64	-64	-64	-64	-64	-64	-1,024
20	-1,024	-64	-64	-64	-64	-64	-64	-1,024
25	-1,024	-64	-64	-64	-64	-64	-64	-1,024
35	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024
8	-1,024	-64	-64	-64	-64	-64	-64	-1,024
10	-1,024	-64	-64	-64	-64	-64	-64	-1,024
15	-1,024	-64	-64	-64	-64	-64	-64	-1,024
20	-1,024	-64	-64	-64	-64	-64	-64	-1,024
25	-1,024	-64	-64	-64	-64	-64	-64	-1,024
35	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
7	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024
8	-1,024	-64	-64	-64	-64	-64	-64	-1,024
10	-1,024	-64	-64	-64	-64	-64	-64	-1,024
15	-1,024	-64	-64	-64	-64	-64	-64	-1,024
20	-1,024	-64	-64	-64	-64	-64	-64	-1,024
25	-1,024	-64	-64	-64	-64	-64	-64	-1,024
35	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-64	-64	-64	-64	-64	-64	-1,024
45	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024	-1,024

Initial Supporting table - P0401: Insufficient EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
74	45	45	45	45	45	45	45	45
75	45	45	45	45	45	45	45	45
78	45	45	45	45	45	45	45	45
80	45	45	45	45	45	45	45	45
83	45	45	45	45	45	45	45	45
85	45	45	45	45	45	45	45	45
88	45	45	45	45	45	45	45	45
91	45	45	45	45	45	45	45	45
94	45	45	45	45	45	45	45	45
97	45	45	45	45	45	45	45	45
100	45	45	45	45	45	45	45	45

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0401: Insufficient EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
74	8	8	8	8	8	8	8	8
75	8	8	8	8	8	8	8	8
78	8	8	8	8	8	8	8	8
80	8	8	8	8	8	8	8	8
83	8	8	8	8	8	8	8	8
85	8	8	8	8	8	8	8	8
88	8	8	8	8	8	8	8	8
91	8	8	8	8	8	8	8	8
94	8	8	8	8	8	8	8	8
97	8	8	8	8	8	8	8	8
100	8	8	8	8	8	8	8	8

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0401: Insufficient EGR intrusive test Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR intrusive test Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Minimum desired EGR flow

Description: Minimum desired EGR flow above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	1,199	1,200	1,400	1,600	1,800	2,000	2,200	2,201
74	1,020	104	104	104	104	104	104	1,020
75	1,020	104	104	104	104	104	104	1,020
78	1,020	104	104	104	104	104	104	1,020
80	1,020	104	104	104	104	104	104	1,020
83	1,020	100	100	100	100	100	100	1,020
85	1,020	100	100	100	100	100	100	1,020
88	1,020	100	100	100	100	100	100	1,020
91	1,020	100	100	100	100	100	100	1,020
94	1,020	100	100	100	100	100	100	1,020
97	1,020	100	100	100	100	100	100	1,020
100	1,020	100	100	100	100	100	100	1,020

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for all others combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	70	70	70	70	70	70	70	70	70	70	70

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256	-256

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	74	75	78	80	83	85	88	91	94	97	100
1	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P0556_BBVS_VacLowFlow

Description: The brake booster vacuum pressure below which the sensor’s output will be considered abnormally low when it is non-increasing when the brake apply is in released condition.

Value Units: KPAa
X Unit: Scaled ambient air pressure (KPAa)

y/x	60	70	80	90	100
1	50	60	70	80	90

Initial Supporting table - P140B, P140C: EGR slow response enabling

Description: Calibration map for the enabling of EGR slow response monitoring, function of combustion mode.

Value Units: boolean

P140B, P140C: EGR slow response enabling - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P140B: Increasing EGR slow response threshold

Description: Threshold for increasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	75	83	98
1	5	5	6

Initial Supporting table - P140C: Decreasing EGR slow response threshold

Description: Threshold for decreasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	75	83	98
1	6	6	6

Initial Supporting table - P2263: Boost pressure system performance monitor delay timer

Description: Delay timer before enabling the boost pressure system performance monitor once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	1	1	1	1	1	1	1

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	-20	-20	-20	-20	-20	-20	-20	-20
2,000	-20	-20	-20	-20	-20	-20	-20	-20
2,500	-20	-20	-20	-20	-20	-20	-20	-20
3,000	-20	-20	-20	-20	-20	-20	-20	-20
3,500	-20	-20	-20	-20	-20	-20	-20	-20
4,000	-20	-20	-20	-20	-20	-20	-20	-20
4,500	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control not active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	-30	-30	-30	-30	-30	-30	-30	-30
2,000	-20	-20	-20	-20	-20	-20	-20	-20
2,500	-20	-20	-20	-20	-20	-20	-20	-20
3,000	-20	-20	-20	-20	-20	-20	-20	-20
3,500	-20	-20	-20	-20	-20	-20	-20	-20
4,000	-20	-20	-20	-20	-20	-20	-20	-20
4,500	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	20	20	20	20	20	20	20	20
2,000	20	20	20	20	20	20	20	20
2,500	20	20	20	20	20	20	20	20
3,000	20	20	20	20	20	20	20	20
3,500	20	20	20	20	20	20	20	20
4,000	20	20	20	20	20	20	20	20
4,500	20	20	20	20	20	20	20	20

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control not active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	100	145	185	230	270	315	360	400
1,500	30	30	30	30	30	30	30	30
2,000	20	20	20	20	20	20	20	20
2,500	20	20	20	20	20	20	20	20
3,000	20	20	20	20	20	20	20	20
3,500	20	20	20	20	20	20	20	20
4,000	20	20	20	20	20	20	20	20
4,500	20	20	20	20	20	20	20	20

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)

y/x	0.0	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
1.0	0.0	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	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
0.0	1.0	5.0	7.0	7.5	8.0	9.0	9.0	9.0	9.0
15.0	-5.0	1.0	2.0	2.5	3.0	3.5	4.0	4.5	5.0
25.0	-4.0	1.0	2.0	2.5	3.0	3.5	4.0	4.5	5.0
35.0	-2.0	1.0	2.0	2.5	3.0	3.5	4.0	4.5	5.0
45.0	-1.0	2.0	3.0	3.5	4.0	4.5	5.0	5.5	6.0
55.0	0.0	2.0	3.0	3.5	4.0	4.5	5.0	5.5	6.0
65.0	0.0	3.0	4.0	4.5	5.0	5.5	6.0	6.5	7.0
75.0	0.0	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0
85.0	1.0	5.0	6.0	6.5	7.0	7.5	8.0	8.5	9.0

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-40	-7	10	35	55	65	90
1	19,000	16,000	12,500	6,800	2,300	2,300	2,300

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest0

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-40	-7	10	35	55	65	90
1	10,500	9,150	7,400	4,800	2,750	1,700	1,700

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	5	

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.050	0.080	0.250	0.350	0.450	0.550	0.750	1.000
1	0	1	1	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.050	0.080	0.250	0.350	0.450	0.550	0.750	1.000
1	0	1	1	1	1	1	1	1	1

Initial Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Value Units: Nominal high state oil pressure (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	449.0	393.0	344.0	271.0	234.0	200.0	189.0	179.0	155.0
1,250.0	472.0	440.0	408.0	377.0	340.0	270.0	261.0	253.0	237.0
1,260.0	473.0	441.0	409.0	378.0	344.0	270.0	262.0	254.0	238.0
1,500.0	485.0	460.0	426.0	412.0	390.0	347.0	343.0	310.0	310.0
2,000.0	493.0	483.0	474.0	462.0	450.0	429.0	421.0	413.0	410.0
2,500.0	509.0	496.0	484.0	470.0	459.0	445.0	437.0	428.0	433.0
3,000.0	520.0	510.0	495.0	499.0	492.0	479.0	469.0	459.0	449.0
3,500.0	558.0	543.0	528.0	514.0	498.0	494.0	482.0	470.0	460.0
4,000.0	549.0	535.0	520.0	510.0	492.0	487.0	473.0	459.0	455.0

Initial Supporting table - P0521_P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Value Units: Nominal low state oil pressure (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40	50	60	70	80	90	100	110	120
1,000	209	200	195	193	185	179	176	170	167
1,250	213	205	202	199	194	189	185	180	175
1,260	213	205	203	200	195	190	186	181	176
1,500	217	208	207	205	200	195	189	184	179
2,000	222	215	215	213	208	205	202	198	195
2,500	226	223	220	218	214	212	209	206	203
3,000	228	226	224	222	219	214	210	205	200
3,500	228	226	224	222	219	214	210	205	201
4,000	228	226	224	222	219	214	210	205	201

Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Max Enable Threshold

Value Units: Maximum engine torque (Nm)
X Unit: Engine speed (RPM)

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	100.0	132.5	145.0	155.0	140.0	90.0	100.0	100.0	0.0

Initial Supporting table - P06DD_P06DE_MinEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Min Enable Threshold

Value Units: Min engine torque (Nm)
X Unit: Engine speed (RPM)

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P06DD_P06DE_MinOilPressThresh

Description: Intrusive diagnostic minimum pressure limit that is a function of Engine Speed and Oil Temperature

Value Units: Minimum engine oil pressure threshold (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40	50	60	70	80	90	100	110	120
1,000	50	50	50	50	50	50	50	50	50
1,250	55	55	55	55	55	55	55	55	55
1,260	55	55	55	55	55	55	55	55	55
1,500	60	60	60	60	60	60	60	60	60
2,000	70	70	70	70	70	70	70	70	70
2,500	80	80	80	80	80	80	80	80	80
3,000	120	120	120	120	120	120	120	120	120
3,500	140	140	140	140	140	140	140	140	140
4,000	160	160	160	160	160	160	160	160	160

Initial Supporting table - P06DD_P06DE_OP_StateChangeMin

Description: Minimum allowed pressure change on a Two Stage Oil Pump state change

Value Units: Min pressure change (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	50.0	40.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0
1,250.0	70.0	60.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
1,260.0	70.0	60.0	50.0	40.0	30.0	20.0	10.0	0.0	0.0
1,500.0	85.0	85.0	85.0	81.0	60.0	46.0	30.0	0.0	0.0
2,000.0	129.0	129.0	110.0	90.0	80.0	65.0	50.0	0.0	0.0
2,500.0	140.0	130.0	120.0	112.0	92.0	78.0	62.0	0.0	0.0
3,000.0	150.0	140.0	130.0	120.0	100.0	90.0	75.0	0.0	0.0
3,500.0	160.0	150.0	140.0	130.0	115.0	105.0	90.0	0.0	0.0
4,000.0	160.0	150.0	150.0	140.0	130.0	120.0	110.0	0.0	0.0

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	0.075	0.075	0.075	0.075

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	350	350	350	350	350
500	350	350	350	350	350
1,100	350	350	350	350	350
1,500	350	350	350	350	350
2,500	350	350	350	350	350

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_EffRgnHysHi

Description:

y/x	0	5	10	15	20	40	50	60	70	80	90	100	110	120	130
0	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
5	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
10	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
15	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
20	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
25	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
30	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
35	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
40	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
45	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
50	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
55	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
60	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
65	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
70	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
75	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
80	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
90	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545
100	535	535	535	545	545	545	545	545	545	545	545	545	545	545	545

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	5	10	15	20	40	50	60	70	80	90	100	110	120	130
0	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
5	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
10	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
15	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
20	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
25	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
30	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
35	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
40	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
45	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
50	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
55	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
60	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
65	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
70	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
75	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
80	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
90	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535
100	525	525	525	535	535	535	535	535	535	535	535	535	535	535	535

Initial Supporting table - DPF_ResistFlowDsblHi

Description:

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	30	58	61	61	61	55	50	40

Initial Supporting table - DPF_ResistFlowDsblLo

Description:								
y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	20	18	16	14	12	10	8	6

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	0	20	40	60	80	100	120	140
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:								
y/x	1,000	1,100	1,500	2,500	2,750	3,500	4,000	5,000
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:								
y/x	1,000	1,100	1,500	2,500	2,750	3,500	4,000	5,000
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - EGT_FuelReqMaxThreshold

Description:

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

Initial Supporting table - EGT_FuelReqMinThrsh

Description:

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

Initial Supporting table - EGT1 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT1 Dynamic Check.

y/x	0.0	5.0	10.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT2 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT2 Dynamic Check.

y/x	0.0	5.0	10.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT3 Dynamic Check.

y/x	0.0	5.0	10.0	40.0	60.0	80.0	120.0
800.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	244,536	219,896	196,560	171,760	157,872	143,992	130,112	115,112

Initial Supporting table - EGT3 Stuck Wait Time

Description:

y/x	-40	0	50	100	140	159	160	180
1	728	650	553	456	378	341	32,768	32,768

Initial Supporting table - EGT3 Stuck Temperature Variation

Description:								
y/x	-40	0	50	100	140	159	160	180
1	200	160	110	60	20	1	0	0

Initial Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

y/x	750	1,000	1,500	2,000	2,500	3,000	4,000	5,000
1	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
6	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1

Initial Supporting table - Exhaust Gas Pressure Too Low Threshold

Description: Diagnostic threshold for the exhaust gas pressure too low monitoring. This threshold is function of the exhaust gas flow and of the soot trapped in the DPF

Value Units: kPa
X Unit: l/s
Y Units: % DPF load

y/x	10	20	60	100	140	198	199	200
40	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0

Initial Supporting table - Flow Resistance Too Low Threshold

Description: Diagnostic threshold for the flow resistance too low monitoring. This threshold is function of the soot trapped in the DPF

Value Units: kPa/(l/s)
X Unit: % DPF load
Y Units: N/A

y/x	10	20	60	100	140	160	180	200
1	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	1

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	0	1	1	

Initial Supporting table - KaFADC_b_SQC_CWA_EnblLink

Description: Engine speed ranges to be learned with CWA before give a positive report to Zero Torque Coordinator.

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

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh2

Description: Threshold 2 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm]

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh2 - Part 1											
y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2											
y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1				
y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2				
y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3				
y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: MPa

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

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	182	113	79	66	0

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-106	-106	-106	-106	0

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: MPa

y/x	1,000	1,200	1,400	1,600	1,800
1	300	300	300	300	300

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000
1	20	20	30	40	48	68	68	68	68	45	35	25

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	10	15	20	25	30	35	40	45	50	60
1,000	11	11	11	11	12	12	13	14	15	17
1,250	11	11	11	11	12	12	13	14	15	17
1,500	11	11	11	11	12	12	13	14	15	17
1,750	11	11	11	11	12	12	13	14	15	17
2,000	11	11	11	11	12	12	13	14	15	17
2,250	11	11	11	11	12	12	13	14	15	17
2,500	11	11	11	11	12	12	13	14	15	17
2,750	11	11	11	11	12	12	13	14	15	17
3,000	11	11	11	11	12	12	13	14	15	17
3,250	11	11	11	11	12	12	13	14	15	17

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	10	15	20	25	30	35	40	45	50	60
1,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,500	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
1,750	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,500	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
2,750	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
3,000	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17
3,250	-8	-9	-10	-11	-12	-12	-13	-14	-15	-17

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	60	60	60	60	60	60	60	60	60	60

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,500	1,750	2,000	2,250	2,500
1	130	136	142	149	155

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-90	-80	-41	-40	-20	0	40	55	56	60	80
-90	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0
-49	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
67	0	0	0	100	100	100	100	100	0	0	0
68	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Lo_FR_MontrEnblHiThrsh

Description:

Value Units: mm^3
X Unit: % DPF load
Y Units: N/A

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000
1	100	100	100	100	100	100	100	100

Initial Supporting table - Lo_FR_MontrEnblLoThrsh

Description: the fuel is outside of the range defined by the vectors ResFlwOfQlow_v and ResFlwOfQhigh_v calibratable and e-speed dependent

Value Units: mm^3
X Unit: rpm
Y Units: N/A

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - Maximum allowed time to complete regeneration

Description:

Value Units: enumerative (mission profiles)
X Unit: seconds
Y Units: N/A

Maximum allowed time to complete regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to complete regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to complete regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	3,600	3,600	3,600	900	3,600		

Initial Supporting table - Maximum allowed time to reach steady state for regeneration

Description:

Value Units: seconds
X Unit: enumerative (mission profiles)
Y Units: N/A

Maximum allowed time to reach steady state for regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1,800	1,800	1,800	1,800	1,800	1,800	1,800

Maximum allowed time to reach steady state for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1,800	1,800	1,800	1,800	1,800	1,800	1,800

Maximum allowed time to reach steady state for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	1,800	1,800	1,800	1,800	1,800		

Initial Supporting table - Maximum allowed time to release post injections for regeneration

Description:

Value Units: enumerative (mission profiles)
X Unit: seconds
Y Units: N/A

Maximum allowed time to release post injections for regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to release post injections for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to release post injections for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	3,600	3,600	3,600	3,600	3,600		

Initial Supporting table - P0087 Minimum rail pressure

Description: Minimum rail pressure threshold (MPa) as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	510	511	600	800	1,000	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,400	4,800
1	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Initial Supporting table - P0089 Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Metering Unit as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,500	4,250	5,250
1	67	217	217	117

Initial Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Define which sensor is used as reference for check plausibility of fuel temperature sensor.
(CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_IAT_Snsr = Intake air temperature, CeFTSR_e_IAT_2_Snsr = Manifold air temperature, CeFTSR_e_MainCatTempSnsr = Upstream DPF temperature)

Value Units: -

y/x	1
1	CeFTSR_e_ECT_Snsr

Initial Supporting table - P0191 Rail Pressure Sensor Configuration

Description:

Value Units: -

y/x	1
1	CeFHPG_e_RPS_DoubleTrack

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	1	0	0	0
CePISR_e_EventA_Seq	1	0	0	0
CePISR_e_EventB_Seq	1	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

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

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	5	

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

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

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

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 - P16F3_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
650	106	117	123	128	147	154
750	102	110	114	118	132	137
850	100	107	110	114	126	130
900	99	104	107	110	120	124
1,200	96	100	102	104	111	113
1,300	95	96	98	99	103	105
1,450	-29	-29	-29	-29	-30	-30
1,600	-38	-39	-40	-42	-46	-45
1,750	-48	-50	-52	-54	-61	-63
2,000	-58	-60	-64	-67	-77	-70
2,250	-68	-71	-75	-79	-93	-90
2,500	-78	-82	-87	-92	-109	-90
3,000	-88	-92	-98	-104	-125	-90
3,500	-98	-103	-110	-116	-141	-90
4,000	-108	-113	-121	-129	-156	-90
4,500	-118	-124	-133	-141	-172	-90
5,000	-128	-134	-145	-154	-188	-200

Initial Supporting table - P228A Fuel High Pressure Pump efficiency

Description: Efficiency percentage of high pressure pump as function of rail pressure (MPa) and engine speed (rpm).

Value Units: %
X Unit: MPa
Y Units: rpm

y/x	30	80	100	120	200
500	100	100	100	100	100
1,000	96	89	86	84	75
1,800	96	90	88	85	75
2,300	96	90	88	86	77
2,800	96	90	88	86	78
3,250	96	90	88	86	78
3,750	93	87	85	83	76
4,400	85	82	78	77	70

Initial Supporting table - P228A Fuel High Pressure Pump efficiency correction

Description: Correction of high pressure pump eficiency as function of fuel temperature (°C).

Value Units: -
X Unit: °C

y/x	-30	-20	28	40	80
1	1	1	1	1	1

Initial Supporting table - P228B Pressure Regulator completely closed command

Description: Command, in terms of pressure (MPa), to consider pressure regulator valve completely closed as function of rail pressure (MPa).

Value Units: MPa
X Unit: MPa

y/x	0	100	190	250
1	30	30	30	30

Initial Supporting table - P228C P228D Air ambient pressure calibrated as enabling condition (MU)

Description: 0 = air ambient pressure is not considered as enabling condition, 1 = air ambient pressure is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P228C P228D Air ambient temperature calibrated as enabling condition (MU)

Description: 0 = air ambient temperature is not considered as enabling condition, 1 = air ambient temperature is considered as enabling condition	
y/x	1
1	1

Initial Supporting table - P228C P228D Low fuel level calibrated as enabling condition (MU)

Description: 0 = low fuel level is not considered as enabling condition, 1 = low fuel level is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P228C Positive rail pressure deviation (MU)

Description: Positive rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

Initial Supporting table - P228D Negative rail pressure deviation (MU)

Description: Negative rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13

Initial Supporting table - P2293 Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Pressure Regulator as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,500	4,250	5,250
1	67	217	217	117

Initial Supporting table - P229A P229B Air ambient pressure calibrated as enabling condition (PR)

Description: 0 = air ambient pressure is not considered as enabling condition, 1 = air ambient pressure is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A P229B Air ambient temperature calibrated as enabling condition (PR)

Description: 0 = air ambient temperature is not considered as enabling condition, 1 = air ambient temperature is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A P229B Low fuel level calibrated as enabling condition (PR)

Description: 0 = low fuel level is not considered as enabling condition, 1 = low fuel level is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A Positive rail pressure deviation (PR)

Description: Positive rail pressure deviation threshold (MPa) when pressure regulator is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

Initial Supporting table - Rail Pressure Control Configuration

Description: CeFHPG_e_MU_And_PR_ModeSel = pressure control can be governed by both metering unit and pressure regulator
CeFHPG_e_MU = pressure control can be governed by metering unit only
CeFHPG_e_PR = pressure control can be governed by pressure regulator only

Value Units: -

y/x	1
1	CeFHPG_e_MU_And_PR_ModeSel

Initial Supporting table - KaFADC_b_SQA_EnblCMBR

Description: SQA combustion mode enable

KaFADC_b_SQA_EnblCMBR - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

KaFADC_b_SQA_EnblCMBR - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - KaFADC_n_SQC_HiThrsh

Description: Engine speed high threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_HiThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	2,300	2,300	2,300	2,300
1	2,300	2,300	2,300	2,300
2	2,300	2,300	2,300	2,300
3	2,300	2,300	2,300	2,300
4	2,300	2,300	2,300	2,300

KaFADC_n_SQC_HiThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	2,300	2,300	2,300	2,300
1	2,300	2,300	2,300	2,300
2	2,300	2,300	2,300	2,300
3	2,300	2,300	2,300	2,300
4	2,300	2,300	2,300	2,300

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	2,300	2,300	2,300	
1	2,300	2,300	2,300	
2	2,300	2,300	2,300	
3	2,300	2,300	2,300	
4	2,300	2,300	2,300	

Initial Supporting table - KaFADC_n_SQC_LoThrsh

Description: Engine speed low threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_LoThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	1,400	1,400	1,400	1,400
1	1,400	1,400	1,400	1,400
2	1,400	1,400	1,400	1,400
3	1,400	1,400	1,400	1,400
4	1,400	1,400	1,400	1,400

KaFADC_n_SQC_LoThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	1,400	1,400	1,400	1,400
1	1,400	1,400	1,400	1,400
2	1,400	1,400	1,400	1,400
3	1,400	1,400	1,400	1,400
4	1,400	1,400	1,400	1,400

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,400	1,400	1,400	
1	1,400	1,400	1,400	
2	1,400	1,400	1,400	
3	1,400	1,400	1,400	
4	1,400	1,400	1,400	

Initial Supporting table - P0216_ET_CumulEnbl

Description: This calibration provides the capability to select which pulses of the injection pattern have to be monitored
1 -> pulse monitored
0 -> pulse NOT monitored

Value Units: Boolean
X Unit: Pulse ID

P0216_ET_CumulEnbl - Part 1

y/x	CeFULR_e_PulsPI	CeFULR_e_PulsR2	CeFULR_e_PulsR1	CeFULR_e_PulsM	CeFULR_e_PulsA1	CeFULR_e_PulsA2	CeFULR_e_PulsA3
1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00

P0216_ET_CumulEnbl - Part 2

y/x	CeFULR_e_PulsA4	CeFULR_e_PulsP1	CeFULR_e_PulsP2	CeFULR_e_PulsP3	CeFULR_e_PulsP4	CeFULR_e_PulsP5	
1.00	1.00	0.00	0.00	0.00	0.00	0.00	

Initial Supporting table - P0216_PulsWidthErrHi

Description: This error threshold map defines the maximum acceptable positive error [us] between cumulative ET HW and ET SW, depending on the number of pulses driven and monitored.

Value Units: us
X Unit: -
Y Units: Number of pulses

y/x	0.00	1.00	2.00	3.00	4.00	5.00
1.00	32,767.00	32,767.00	45.00	250.00	200.00	50.00

Initial Supporting table - P054E_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054E_IFM_CombModesEnbl - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P054E_IFM_CombModesEnbl - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

P054E_IFM_CombModesEnbl - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P054E_IFM_CombModesEnbl - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P054E_IFM_MinFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	20	20	20	20	20
-10	15	15	15	15	15
0	12	12	12	12	12
20	9	9	9	9	9
40	7	7	7	7	7
70	6	6	6	6	6

Initial Supporting table - P054E_IFM_MinFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	14	14	14	14	14
-10	11	11	11	11	11
0	9	9	9	9	9
20	6	6	6	6	6
40	6	6	6	6	6
70	6	6	6	6	6

Initial Supporting table - P054E_IFM_MinFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	30	30	30	30	30
-10	25	25	25	25	25
0	22	22	22	24	22
20	20	20	20	20	20
40	16	16	19	16	16
70	13	13	13	13	13

Initial Supporting table - P054E_IFM_MinFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	13	13	13	13	13
-10	11	11	11	11	11
0	7	7	7	7	7
20	8	8	8	8	8
40	4	4	4	4	4
70	3	3	3	3	3

Initial Supporting table - P054E_IFM_MinFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	30	30	30	30	30
-10	25	25	25	25	25
0	22	22	22	24	22
20	20	20	20	20	20
40	16	16	19	16	16
70	13	13	13	13	13

Initial Supporting table - P054E_IFM_MinFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	13	13	13	13	13
-10	11	11	11	11	11
0	7	7	7	7	7
20	8	8	8	8	8
40	4	4	4	4	4
70	3	3	3	3	3

Initial Supporting table - P054E_IFM_MinFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	20	20	20	20	20
-10	15	15	15	15	15
0	12	12	12	12	12
20	9	9	9	9	9
40	7	7	7	7	7
70	6	6	6	6	6

Initial Supporting table - P054E_IFM_MinFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	14	14	14	14	14
-10	11	11	11	11	11
0	9	9	9	9	9
20	6	6	6	6	6
40	6	6	6	6	6
70	4	4	4	4	4

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054F_IFM_CombModesEnbl - Part 1					
y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P054F_IFM_CombModesEnbl - Part 2					
y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

P054F_IFM_CombModesEnbl - Part 3					
y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P054F_IFM_CombModesEnbl - Part 4					
y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	31	31	31	31	31
-10	29	29	29	29	29
0	25	25	25	25	25
20	19	19	19	19	19
40	19	19	19	19	19
70	18	18	18	18	18

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	26	26	26	26	26
-10	24	24	24	24	24
0	20	20	20	20	20
20	16	16	16	16	16
40	16	16	16	16	16
70	16	16	16	16	16

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	40	40	40	40	40
-10	35	35	35	35	35
0	32	32	32	34	32
20	29	29	29	29	29
40	26	26	28	26	26
70	23	23	23	23	23

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	24	24	24	24	24
-10	23	23	23	23	23
0	18	18	18	18	18
20	19	19	19	19	19
40	15	15	15	15	15
70	14	14	14	14	14

Initial Supporting table - P054F_IFM_MaxFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	40	40	40	40	40
-10	35	35	35	35	35
0	32	32	32	34	32
20	29	29	29	29	29
40	26	26	28	26	26
70	23	23	23	23	23

Initial Supporting table - P054F_IFM_MaxFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	24	24	24	24	24
-10	23	23	23	23	23
0	18	18	18	18	18
20	19	19	19	19	19
40	15	15	15	15	15
70	14	14	14	14	14

Initial Supporting table - P054F_IFM_MaxFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	34	34	34	34	34
-10	31	31	31	31	31
0	27	27	27	27	27
20	19	19	19	19	19
40	19	19	19	19	19
70	18	18	18	18	18

Initial Supporting table - P054F_IFM_MaxFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	580	730	800	1,200	1,430
-20	26	26	26	26	26
-10	24	24	24	24	24
0	20	20	20	20	20
20	16	16	16	16	16
40	16	16	16	16	16
70	16	16	16	16	16

Initial Supporting table - P2BAA RDP Min Press Drop

Description: This calibration is used to define the minimum expected pressure drop based on pump efficiency after that the injection is commanded. The input of this table is the motorpump average commanded duty cycle before the injection is commanded

Value Units: kPa
X Unit: %

y/x	40	45	50	55	60	65	70	75	80
1	40	42	44	45	47	48	49	51	53

Initial Supporting table - P2ADD_Measure_Error

Description: Maximum temperature measurement error as function of last good measured temperature

Value Units: °C
X Unit: °C

y/x	-40.0	-20.0	80.0	120.0
1.0	3.0	2.0	3.0	3.0

Unique Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Define which sensor is used as reference for check plausibility of fuel temperature sensor.
(CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_IAT_Snsr = Intake air temperature, CeFTSR_e_IAT_2_Snsr = Manifold air temperature, CeFTSR_e_MainCatTempSnsr = Upstream DPF temperature)

Value Units: -

y/x	1
1	CeFTSR_e_ECT_Snsr

Unique Supporting table - P08A8 EngTorqueThreshold Table

Description: The diagnostic is inhibited if torque (NM) is less than this value. Prevents false fails in regions where false in-gear N/TOS ratios are possible due to low torque, where high torque would otherwise cause slip and prevent a valid in-gear state.

Value Units: Torque (NM)
X Unit: Percent Clutch Pedal Position (%)

y/x	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
1	30.0	30.0	30.0	30.0	40.0	40.0	100.0	100.0	155.0	180.0	180.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P08A8 ResidualErrEnableHigh Table

Description: Represents the upper threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The lower threshold of the deadband is represented by the table "P08A8 ResidualErrEnableLow Table". A lower threshold value that is greater than or equal to the upper threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P08A8 ResidualErrEnableLow Table

Description: Represents the lower threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The upper threshold of the deadband is represented by the table "P08A8 ResidualErrEnableHigh Table". An upper threshold value that is less than or equal to the lower threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Transmission Control Module (TCM)	P0601	Transmission Electro-Hydraulic Control Module Read Only Memory	Incorrect program/calibrations checksum	= TRUE Boolean			>= 5 Fail Counts	One Trip
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0601 ECM: None		
Transmission Control Module (TCM)	P0603	Transmission Electro-Hydraulic Control Module Long-Term Memory Reset	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE Boolean			Runs Continously	One Trip
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0603 ECM: None		
Transmission Control Module (TCM)	P0604	Transmission Electro-Hydraulic Control Module Random Access Memory	RAM Read/Write Failure (Single Word)	= TRUE Boolean			>= 5 Fail Counts = 16 Sample Counts	One Trip
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0604 ECM: None		
Transmission Control Module (TCM)	P062F	Transmission Electro-Hydraulic Control Module Long Term Memory Performance	TCM Non-Volatile Memory bit Incorrect flag at Powerdown	= TRUE Boolean			Runs Continously	One Trip
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P062F ECM: None		
Transmission Control Module (TCM)	P0634	Transmission Electro-Hydraulic Control Module Internal Temperature Too High	Fail Case 1 Substrate Temperature	>= 144 ºC			>= 5 Fail Time (Sec)	One Trip
			Fail Case 2 Substrate Temperature Ignition Voltage	>= 50 ºC >= 18 Volts			>= 2 Fail Time (Sec)	
			Note: either fail case can set the DTC					
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Substrate Temp Lo	>= 0 ºC		
					Substrate Temp Hi	<= 240 ºC		
					Substrate Temp Between Temp Range for Time	>= 0.25 Sec		
					P0634 Status is	≠ Test Failed This Key On or Fault Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
High Side Driver 1	P0658	Actuator Supply Voltage Circuit Low	The HWIO reports a low voltage (open or ground short) error flag	= TRUE Boolean			>= 4 Fail Counts out of 6 Sample Counts	One Trip
					P0658 Status is not	= Test Failed This Key On or Fault Active		
					High Side Driver 1 On	= True Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P0667	TCM Internal Temp (substrate) Sensor Circuit Range/Performance	If transmission oil temp to substrate temp Δ	> Refer to Table 19 in supporting documents ℃				Two Trips
			If TCM substrate temp to power up temp Δ	> Refer to Table 20 in supporting documents ℃				
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.				>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until				>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)	
					Engine Torque Signal Valid	= TRUE Boolean		
					Accelerator Position Signal Valid	= TRUE Boolean		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Brake torque active	= FALSE		
					Below describes the brake torque entry criteria			
					Engine Torque	>= 90 N*m		
					Throttle	>= 30.000305 Pct		
					Transmission Input Speed	<= 200 RPM		
					Vehicle Speed	<= 8 Kph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Transmission Range	≠ Park		
					Transmission Range	≠ Neutral		
					PTO	= Not Active		
					Set Brake Torque Active TRUE if above conditions are met for:	>= 7 sec		
					Below describes the brake torque exit criteria			
					Brake torque entry criteria	= Not Met		
					Clutch hydraulic pressure	≠ Clutch Hydraulic Air Purge Event		
					Clutch used to exit brake torque active	= CeTFTD_e_C3_RatlEnbl		
					The above clutch pressure is greater than this value for one loop	>= 600 kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>= 20 Sec		
					P0667 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Control Module (TCM)	P0668	TCM internal temperature (substrate) thermistor failed at a low voltge	Type of Sensor Used	= CeTFTI_e_VoltageInverseProp				Two Trips
			If TCM Substrate Temperature Sensor = Direct Proportional and Temp	<= 254 ºC				
			If TCM Substrate Temperature Sensor = Indirect Proportional and Temp	>= 254 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Timer (Sec)	
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0668 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P0669	TCM internal temperature (substrate) thermistor failed at a high voltage	Type of Sensor Used	= CeTFTI_e_VoltageInverseProp				Two Trips
			If TCM Substrate Temperature Sensor = Direct Proportional and Temp	>= -254 ºC				
			If TCM Substrate Temperature Sensor = Indirect Proportional and Temp	<= -254 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Timer (Sec)	
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0669 Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P06AC	TCM Power-up Temp Sensor Circuit Range/Performance	If TCM power-up temp to substrate temp Δ	> Refer to Table 20 in supporting documents ºC				Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If transmission oil temp to power up temp Δ	> Refer to Table 18 in supporting documents °C								
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.						>=	3000	Fail Counts (100ms loop)	
									Out of	3750	Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until						>=	700	Pass Counts (100ms loop)	
									Out of	875	Sample Counts (100ms loop)	
					Engine Torque Signal Valid	=	TRUE	Boolean				
					Accelerator Position Signal Valid	=	TRUE	Boolean				
					Ignition Voltage Lo	>=	9	Volts				
					Ignition Voltage Hi	<=	31.990234	Volts				
					Engine Speed Lo	>=	400	RPM				
					Engine Speed Hi	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					Brake torque active	=	FALSE					
					Below describes the brake torque entry criteria							
					Engine Torque	>=	90	N*m				
					Throttle	>=	30.000305	Pct				
					Transmission Input Speed	<=	200	RPM				
					Vehicle Speed	<=	8	Kph				
					Transmission Range	≠	Park					
					Transmission Range	≠	Neutral					
					PTO	=	Not Active					
					Set Brake Torque Active TRUE if above conditions are met for:	>=	7	sec				
					Below describes the brake torque exit criteria							
					Brake torque entry criteria	=	Not Met					
					Clutch hydraulic pressure	≠	Clutch Hydraulic Air Purge Event					
					Clutch used to exit brake torque active	=	CeTFTD_e_C3_RatlEnbl					
					The above clutch pressure is greater than this value for one loop	>=	600	kpa				
					Set Brake Torque Active FALSE if above conditions are met for:	>=	20	Sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P06AC Status is	≠ Test Failed This Key On or Fault Active		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Control Module (TCM)	P06AD	TCM power-up thermistor circuit voltage low	Power Up Temp	<= 254 ºC			>= 60 Fail Time (Sec)	Two Trips
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P06AD Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P06AE	TCM power-up thermistor circuit voltage high	Power Up Temp	>= -254 ºC			>= 60 Fail Time (Sec)	Two Trips
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P06AE Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Fluid Temperature Sensor (TFT)	P0711	Trans Fluid Temp Sensor Circuit Range/Performance	If transmission oil temp to substrate temp Δ	> Refer to Table 19 in supporting documents ºC				Two Trips
			If transmission oil temp to power up temp Δ	> Refer to Table 18 in supporting documents ºC				
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.				>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until				>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)	
					Engine Torque Signal Valid	= TRUE Boolean		
					Accelerator Position Signal Valid	= TRUE Boolean		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Brake torque active	= FALSE		
					Below describes the brake torque entry criteria			
					Engine Torque	>= 90 N*m		
					Throttle	>= 30.000305 Pct		
					Transmission Input Speed	<= 200 RPM		
					Vehicle Speed	<= 8 Kph		
					Transmission Range	≠ Park		
					Transmission Range	≠ Neutral		
					PTO	= Not Active		
					Set Brake Torque Active TRUE if above conditions are met for:	>= 7 sec		
					Below describes the brake torque exit criteria			
					Brake torque entry criteria	= Not Met		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Clutch hydraulic pressure	≠ Clutch Hydraulic Air Purge Event		
					Clutch used to exit brake torque active	= CeTFTD_e_C3_RatlEnbl		
					The above clutch pressure is greater than this value for one loop	>= 600 kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>= 20 Sec		
					P0711 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Fluid Temperature Sensor (TFT)	P0712	Transmission fluid temperature thermistor failed at a low voltage	Type of Sensor Used	= CeTFTI_e_VoltageInverseProp				Two Trips
			If Transmission Fluid Temperature Sensor = Direct Proportional and Temp	<= 254 °C				
			If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp	>= 254 °C				
			Either condition above will satisfy the fail conditions				>= 60 Fail Time (Sec)	
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0712 Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Fluid Temperature Sensor (TFT)	P0713	Transmission fluid temperature thermistor failed at a high voltage	Type of Sensor Used	= CeTFTI_e_VoltageInverseProp				Two Trips
			If Transmission Fluid Temperature Sensor = Direct Proportional and Temp	>= -254 ºC				
			If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp	<= -254 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Time (Sec)	
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0713 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0713, P0716, P0717, P0722, P0723 ECM: None		
Transmission Input Speed Sensor (TISS)	P0716	Input Speed Sensor Performance	Transmission Input Speed Sensor Drops	>= 1350 RPM			>= 0.8 Fail Time (Sec)	One Trip
					Engine Torque is	>= 0 N*m		
					Engine Torque is	<= 8191.875 N*m		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Vehicle Speed is	>= 10 Kph		
					Throttle Position is	>= 0 Pct		

					Transmission Input Speed is	>= 0 RPM		
					The previous requirement has been satisfied for	>= 0 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					The change (loop to loop) in transmission input speed is	< 8191.75 RPM/Loop		
					The previous requirement has been satisfied for	>= 0 Sec		
					Throttle Position Signal Valid	= TRUE Boolean		
					Engine Torque Signal Valid	= TRUE Boolean		
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					P0716 Status is not	= Test Failed This Key On or Fault Active		
					Disable Conditions:	MIL not Illuminated for DTC's: TCM: P0717, P0752, P0973, P0974 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Transmission Input Speed Sensor (TISS)	P0717	Input Speed Sensor Circuit Low Voltage	Fail Case 1 Transmission Input Speed is	< 33 RPM			>= 4.5 Fail Time (Sec)	One Trip
			Fail Case 2 When P0722 DTC Status equal to Test Failed and Transmission Input Speed is	< 1000 RPM	Controller uses a single power supply for the speed sensors	= 1 Boolean		
					Engine Torque is	>= 50 N*m		
					Engine Torque is	<= 8191.875 N*m		
					Vehicle Speed	>= 16 Kph		
					Engine Torque Signal Valid	= TRUE Boolean		
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0717 Status is not	= Test Failed This Key On or Fault Active		
					Disable Conditions:	MIL not Illuminated for DTC's: TCM: P0722, P0723 ECM: P0101, P0102, P0103		
Transmission Output Speed Sensor (TOSS)	P0722	Output Speed Sensor Circuit Low Voltage	Transmission Output Speed Sensor Raw Speed	<= 35 RPM			>= 4.5 Fail Time (Sec)	One Trip
					P0722 Status is not	= Test Failed This Key On or Fault Active		
					Transmission Input Speed Check	= TRUE Boolean		
					Engine Torque Check	= TRUE Boolean		
					Throttle Position	>= 8.0001831 Pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Transmission Fluid Temperature	>=	-40	ºC		
					Disable this DTC if the PTO is active	=	1	Boolean		
					Engine Torque Signal Valid	=	TRUE	Boolean		
					Throttle Position Signal Valid	=	TRUE	Boolean		
					Ignition Voltage is	>=	9	Volts		
					Ignition Voltage is	<=	31.990234	Volts		
					Engine Speed is	>=	400	RPM		
					Engine Speed is	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Enable_Flags Defined Below					
					The Engine Torque Check is TRUE, if either of the two following conditions are TRUE					
					Engine Torque Condition 1					
					Range Shift Status	≠	Range shift completed	ENUM		
					OR					
					Transmission Range is	=	Park or Neutral			
					Engine Torque is	>=	8191.75	N*m		
					Engine Torque is	<=	8191.75	N*m		
					Engine Torque Condition 2					
					Engine Torque is	>=	30	N*m		
					Engine Torque is	<=	8191.75	N*m		

					The Transmission Input Speed (TIS) Check is TRUE, if either of the two following conditions are TRUE					
					TIS Check Condition 1					
					Transmission Input Speed is	>=	1000	RPM		
					Transmission Input Speed is	<=	8191.75	RPM		
					TIS Check Condition 2					
					Engine Speed without the brake applied is	>=	3200	RPM		
					Engine Speed with the brake applied is	>=	3200	RPM		
					Engine Speed is	<=	8191.75	RPM		
					Controller uses a single power supply for the speed sensors	=	1	Boolean		
					Powertrain Brake Pedal is Valid	=	TRUE	Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0723 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Transmission Output Speed Sensor (TOSS)	P0723	Output Speed Sensor Circuit Intermittent	Transmission Output Speed Sensor Raw Speed Output Speed Delta Output Speed Drop AND Transmission Range is	>= 105 RPM <= 8191.75 RPM > 1000 RPM = Driven range (R,D)			>= 0 Enable Time (Sec) >= 0 Enable Time (Sec) >= 3 Output Speed Drop Recovery Fail Time (Sec)	One Trip
					---------- Range_Disable OR ---------- Neutral_Range_Enable And Neutral_Speed_Enable are TRUE concurrently ----------	= = =	FALSE See Below TRUE See Below TRUE See Below	
					Transmission_Range_Enable Transmission_Input_Speed_Enable No Change in Transfer Case Range (High <-> Low) for P0723 Status is not Disable this DTC if the PTO is active Ignition Voltage is Ignition Voltage is Engine Speed is Engine Speed is Engine Speed is within the allowable limits for	= = >= = = >= <= >= <= >=	TRUE See Below TRUE See Below 5 Seconds Test Failed This Key On or Fault Active 1 Boolean 9 Volts 31.990234 Volts 400 RPM 7500 RPM 5 Sec	
					Enable_Flags Defined Below			
					Transmission_Input_Speed_Enable is TRUE when either TIS Condition 1 or TIS Condition 2 is TRUE: TIS Condition 1 is TRUE when both of the following conditions are satsified for Input Speed Delta Raw Input Speed TIS Condition 2 is TRUE when ALL of the next two conditions are satisfied Input Speed	 >= <= >= = 	 0 Enable Time (Sec) 4095 RPM 500 RPM 0 RPM	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					A Single Power Supply is used for all speed sensors ----------	=	TRUE	Boolean		
					Neutral_Range_Enable is TRUE when any of the next 3 conditions are TRUE Transmission Range is	=	Neutral	ENUM		
					Transmission Range is	=	Reverse/Neutral Transitonal	ENUM		
					Transmission Range is	=	Neutral/Drive Transitional	ENUM		
					And when a drop occurs Loop to Loop Drop of Transmission Output Speed is ----------	>	650	RPM		
					Range_Disable is TRUE when any of the next three conditions are TRUE Transmission Range is	=	Park	ENUM		
					Transmission Range is	=	Park/Reverse Transitonal	ENUM		
					Input Clutch is not ----------	=	ON (Fully Applied)	ENUM		
					Neutral_Speed_Enable is TRUE when All of the next three conditions are satsified for	>	1.5	Seconds		
					Transmission Output Speed	>	130	RPM		
					The loop to loop change of the Transmission Output Speed is	<	125	RPM		
					The loop to loop change of the Transmission Output Speed is ----------	>	-10	RPM		
					Transmission_Range_Enable is TRUE when one of the next six conditions is TRUE Transmission Range is	=	Neutral	ENUM		
					Transmission Range is	=	Reverse/Neutral Transitional	ENUM		
					Transmission Range is	=	Neutral/Drive Transitional	ENUM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Time since a driven range (R,D) has been selected	>= Table Based Time Please Refer to Table 21 in supporting documents Sec		
					Transmission Output Speed Sensor Raw Speed	>= 500 RPM		
					Output Speed when a fault was detected	>= 500 RPM		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0973, P0974, P0976, P0977 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Torque Converter Clutch (TCC)	P0741	TCC System Stuck OFF	TCC Pressure	>= 500 Kpa			>= 2 Enable Time (Sec)	Two Trips
			Either Condition (A) or (B) Must be Met					
			(A) TCC Slip Error @ TCC On Mode	>= Refer to Table 1 in Supporting Documents RPM			>= 5 Fail Time (Sec)	
			(B) TCC Slip @ Lock On Mode	>= 130 RPM			>= 5 Fail Time (Sec)	
			If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter				>= 2 TCC Stuck Off Fail Counter	
					TCC Mode	= On or Lock		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Engine Torque Lo	>= 50 N*m		
					Engine Torque Hi	<= 8191.875 N*m		
					Throttle Position Lo	>= 8.0001831 Pct		
					Throttle Position Hi	<= 99.998474 Pct		
					2nd Gear Ratio Lo	>= 2.7528076 Ratio		
					2nd Gear Ratio High	<= 3.1672363 Ratio		
					3rd Gear Ratio Lo	>= 1.7762451 Ratio		
					3rd Gear Ratio High	<= 2.0437012 Ratio		
					4th Gear Ratio Lo	>= 1.3485107 Ratio		
					4th Gear Ratio High	<= 1.5515137 Ratio		
					5th Gear Ratio Lo	>= 0.9300537 Ratio		
					5th Gear Ratio Hi	<= 1.0699463 Ratio		
					6th Gear Ratio Lo	>= 0.6975098 Ratio		
					6th Gear Ratio High	<= 0.8024902 Ratio		
					Transmission Fluid Temperature Lo	>= -6.65625 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Transmission Fluid Temperature Hi	<= 130 ºC		
					PTO Not Active	= TRUE Boolean		
					Engine Torque Signal Valid	= TRUE Boolean		
					Throttle Position Signal Valid	= TRUE Boolean		
					Dynamic Mode	= FALSE Boolean		
					P0741 Status is	≠ Test Failed This Key On or Fault Active		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P0742, P2763, P2764 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Torque Converter Clutch (TCC)	P0742	TCC System Stuck ON	TCC Slip Speed	>= -50 RPM				One Trip
			TCC Slip Speed	<= 13 RPM			>= 0.6 Fail Time (Sec)	
			If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter				>= 5 Fail Counter	
					TCC Mode	= Off		
					Enable test if Cmnd Gear = 1stFW and value true	= 1 Boolean		
					Enable test if Cmnd Gear = 2nd and value true	= 0 Boolean		
					Engine Speed Hi	<= 6000 RPM		
					Engine Speed Lo	>= 500 RPM		
					Vehicle Speed HI	<= 511 KPH		
					Vehicle Speed Lo	>= 1 KPH		
					Engine Torque Hi	<= 8191.875 Nm		
					Engine Torque Lo	>= 60 Nm		
					Current Range	≠ Neutral Range		
					Current Range	≠ Reverse Range		
					Transmission Sump Temperature	<= 130 ºC		
					Transmission Sump Temperature	>= 15 ºC		
					Throttle Position Hyst High AND	>= 10.00061 Pct		
					Max Vehicle Speed to Meet Throttle Enable	<= 8 KPH		
					Once Hyst High has been met, the enable will remain while Throttle Position	>= 2.0004272 Pct		
					Disable for Throttle Position	>= 75 Pct		
					Disable if PTO active and value true	= 1 Boolean		
					Disable if in D1 and value true	= 1 Boolean		
					Disable if in D2 and value true	= 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Disable if in D3 and value true	= 1 Boolean		
					Disable if in D4 and value true	= 1 Boolean		
					Disable if in D5 and value true	= 1 Boolean		
					Disable if in MUMD and value true	= 1 Boolean		
					Disable if in TUTD and value true	= 1 Boolean		
					4 Wheel Drive Low Active	= FALSE Boolean		
					Disable if Air Purge active and value false	= 0 Boolean		
					RVT Diagnostic Active	= FALSE Boolean		
					Ignition Voltage	>= 9 V		
					Ignition Voltage	<= 31.990234 V		
					Vehicle Speed	<= 511 KPH		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Engine Torque Signal Valid	= TRUE Boolean		
					Throttle Position Signal Valid	= TRUE Boolean		
					P0742 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P0741, P2763, P2764 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Mode 2 Multiplex Valve	P0751	Shift Solenoid Valve A Stuck Off	Commaned Gear Slip	>= 400 RPM				Two Trips
			Commanded Gear	= 1st Lock rpm				
			Gear Ratio	<= 1.518310547			>= 0.3 Fail Tmr	
			Gear Ratio	>= 1.373657227			= 5 Fail Counts	
			If the above parameters are true				≠ 0 Neutral Timer (Sec)	
							>= 0.3 Fail Timer (Sec)	
							>= 8 Counts	
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Transmission Fluid Temperature	>= -6.65625 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Range Shift State = Range Shift Completed ENUM			
					TPS >= 0.5004883 % OR Output Speed >= 100 RPM			
					Throttle Position Signal Valid from ECM = TRUE Boolean			
					Engine Torque Signal Valid from ECM, High side driver is enabled = TRUE Boolean			
					High-Side Driver is Enabled = TRUE Boolean			
					Input Speed Sensor fault = FALSE Boolean			
					Output Speed Sensor fault = FALSE Boolean			
					Default Gear Option is not present = TRUE			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Mode 2 Multiplex Valve	P0752	Shift Solenoid Valve A Stuck On	Gear Box Slip	>= 400 RPM			>= Please Refer to Table 16 in Supporting Documents Neutral Timer (Sec)	One Trip
			Commanded Gear	= 3rd Gear				
			Commanded Gear has Achieved 1st Locked OR 1st Free-Wheel OR 2nd with Mode 2 Sol. Commanded On	= TRUE Boolean				
			If the above parameters are true					
			Command 4th Gear once Output Shaft Speed	<= 1000 RPM				
			If Gear Ratio	>= 4.354858398				
			And Gear Ratio	<= 4.813232422				
							>= 1.5 Fail Timer (Sec)	
							>= 5 Counts	
					Ignition Voltage Lo >= 9 Volts			
					Ignition Voltage Hi <= 31.990234 Volts			
					Engine Speed Lo >= 400 RPM			
					Engine Speed Hi <= 7500 RPM			
					Engine Speed is within the allowable limits for >= 5 Sec			
					High-Side Driver is Enabled = TRUE Boolean			
					Throttle Position Signal Valid from ECM = TRUE Boolean			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Output Speed	>= 100 RPM		
					OR			
					TPS	>= 0.5004883 %		
					Range Shift State	= Range Shift Completed ENUM		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0776	Pressure Control (PC) Solenoid B Stuck Off [C35R]	Fail Case 1 Case: Steady State 3rd Gear					One Trip
			Commanded Gear	= 3rd Gear				
			Gearbox Slip	>= 400 RPM				
							>= Please Refer to Table 16 in Supporting Documents Neutral Timer (Sec)	
			Command 4th Gear once Output Shaft Speed	<= 1000 RPM				
			If Gear Ratio	>= 1.373657227				
			And Gear Ratio	<= 1.518310547				
							>= 3 Fail Timer (Sec)	
			It the above condiations are true, Increment 3rd gear fail counter				>= 2 3rd Gear Fail Counts or	
			and C35R Fail counter				>= 14 3-5R Clutch Fail Counts	
			Fail Case 2 Case: Steady State 5th Gear					
			Commanded Gear	= 5th Gear				
			Gearbox Slip	>= 400 Rpm			>= Please Refer to Table 5 in Supporting Documents Neutral Timer (Sec)	
			Intrusive Test: Command 6th Gear					
			If attained Gear=6th gear Time	>= Please refer to Table 3 in supporting documents Shift Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			It the above condiations are true, Increment 5th gear fail counter				>= 3 5th Gear Fail Counts	
			and C35R Fail counter				or >= 14 3-5R Clutch Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 100 RPM		
					A OR B			
					(A) Output speed enable	>= 100 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0777	Pressure Control (PC) Solinoid B Stuck On [C35R] (Steady State)	Fail Case 1 Case: Steady State 1st					One Trip
			Attained Gear slip	>= 400 RPM				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 4 in supporting documents		Enable Time (Sec)		
			Intrusive test: (CBR1 clutch exhausted)					
			Gear Ratio	<= 2.007324219				
			Gear Ratio	>= 1.744628906				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 2 Fail Count in 1st Gear or >= 3 Total Fail Counts	
			Fail Case 2 Case: Steady State 2nd gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 2.007324219				
			Gear Ratio	>= 1.744628906				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 2nd Gear or >= 3 Total Fail Counts	
			Fail Case 3 Case: Steady State 4th gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C1234 clutch exhausted)					
			Gear Ratio	<= 1.069946289				
			Gear Ratio	>= 0.930053711				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 4th Gear or >= 3 Total Fail Counts	
			Fail Case 4 Case: Steady State 6th gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.069946289			>= 1.1 Fail Timer (Sec)	
			Gear Ratio	>= 0.930053711			>= 3 counts	
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 6th Gear or >= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 100 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 10.00061 Pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					if Attained Gear=1st FW Engine Torque Enable	>= 45 Nm		
					if Attained Gear=1st FW Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0777	Pressure Control (PC) Solenoid B StuckOn [C35R] (Dymanic)	Primary Offgoing Clutch is exhausted (See Table 12 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized Clutch				
			Primary Offgoing Clutch Pressure Command Status	= exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 50 RPM				
			If the above conditions are true run appropriate Fail 1 Timers Below:					
			fail timer 1 (3-1 shifting with Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-2 shifting with Throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (3-2 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-4 shifting with Throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (3-4shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-5 shifting with Throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (3-5 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with Throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-4 shifting with Throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (5-4 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (5-6 shifting with Throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (5-6 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 >= sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			3rd gear fail counter				>= 3 3rd gear fail counts OR	
			5th gear fail counter				>= 3 5th gear fail counts OR	
			Total fail counter				>= 3 total fail counts	
					TUT Enable temperature	>= -6.65625 °C		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 200 RPM		
					input speed limit for TUT	>= 200 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		
					Default Gear Option is not present	= TRUE		
			Disable Conditions:		MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Output Speed Sensor (TOSS)	P077C	Output Speed Sensor Circuit Low	TOSS Analog Signal Voltage	<= 0.25 Volts			>= 5.00E-02 sec	One Trip
			P077C Status is not	= Test Failed This Key On or Fault Active				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the above conditons have been met, increment the P077C Fail Counter					
			DTC P077C Sets when the Fail Counter	>= 75 Counts	P077C Enable Calibration = 1 Boolean Ignition Voltage Lo >= 9 Volts Ignition Voltage Hi <= 31.990234 Volts			
					Disable MIL not Illuminated for DTC's:	TCM: P077D		
Transmission Output Speed Sensor (TOSS)	P077D	Output Speed Sensor Circuit High	TOSS Analog Signal Voltage	>= 4.75 Volts			>= 5.00E-02 sec	One Trip
			P077D Status is not	= Test Failed This Key On or Fault Active				
			If the above conditons have been met, increment the P077D Fail Counter					
			DTC P077D Sets when the Fail Counter	>= 75 Counts	P077D Enable Calibration = 1 Boolean Ignition Voltage Lo >= 9 Volts Ignition Voltage Hi <= 31.990234 Volts			
					Disable MIL not Illuminated for DTC's:	TCM: P077C		
Variable Bleed Solenoid (VBS)	P0796	Pressure Control (PC) Solenoid C Stuck Off [C456] (Steady State)	Fail Case 1 Case: Steady State 4th Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear ≠5th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 4th Gear Fail Counter				>= 2 4th Gear Fail Count OR	
			and C456 Fail Counters				>= 14 C456 Fail Counts	
			Fail Case 2 Case: Steady State 5th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Intrusive test: commanded 6th gear					
			If attained Gear ≠ 6th for time	>= Please Refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 5th Gear Fail Counter				>= 2 5th Gear Fail Count	
							OR	
			and C456 Fail Counters				>= 14 C456 Fail Counts	
			Fail Case 3 Case: Steady State 6th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear ≠ 5th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 6th Gear Fail Counter and C456 Fail Counter				>= 2 6th Gear Fail Count	
							OR	
			and C456 Fail Counter				>= 14 C456 Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 100 RPM		
					A OR B			
					(A) Output speed enable	>= 100 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					OutputSpeed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0797	Pressure Control (PC) Solenoid C Stuck On [C456] (Steady State)	Fail Case 1 Case: Steady State 1st Attained Gear slip If the Above is True for Time Intrusive test: (CBR1 clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	>= 400 RPM >= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec) <= 1.529052734 >= 1.328979492			>= 1.1 Fail Timer (Sec) >= 2 Fail Count in 1st Gear or >= 3 Total Fail Counts	One Trip
			Fail Case 2 Case Steady State 2nd Max Delta Output Speed Hysteresis Min Delta Output Speed Hysteresis If the Above is True for Time Intrusive test: (CB26 clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec >= Table Based value Please Refer to Table 23 in supporting documents rpm/sec >= Table Based Time Please Refer to Table 17 in supporting documents Sec <= 1.529052734 >= 1.328979492			>= 1.1 Fail Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 3 Fail Count in 2nd Gear or >= 3 Total fail counts	
			Fail Case 3 Case Steady State 3rd					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 1.529052734				
			Gear Ratio	>= 1.328979492				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 3rd Gear OR >= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 100 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 10.00061 Pct		
					if Attained Gear=1st FW Engine Torque Enable	>= 45 Nm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					if Attained Gear=1st FW			
					Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0797	Pressure Control (PC) Solenoid C Stuck On [C456] (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 11 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized Clutch				
			Primary Offgoing Clutch Pressure Command Status	= exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 50 RPM				
			If the above conditions are true increment appropriate Fail 1 Timers Below:					
			fail timer 1 (4-1 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (4-1 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (4-2 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (4-2 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (4-3 shifting with throttle)	>= 0.700195313 Fail Time (Sec)				
			fail timer 1 (4-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (5-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (6-2 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (6-2 shifting without throttle)	>= 0.5 Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			4th gear fail counter				>= 3 Fail Counter From 4th Gear OR	
			5th gear fail counter				>= 3 Fail Counter From 5th Gear OR	
			6th gear fail counter				>= 3 Fail Counter From 6th Gear OR	
			Total fail counter				>= 3 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 °C		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 200 RPM		
					input speed limit for TUT	>= 200 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Input Speed Sensor (TISS)	P07BF	Input/Turbine Speed Sensor A Circuit Low	TISS Analog Signal Voltage	<= 0.25 Volts			>= 5.00E-02 sec	One Trip
			P07BF Status is not	= Test Failed This Key On or Fault Active				
			If the above conditons have been met, increment the P07BF Fail Counter					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			DTC P07BF Sets when the Fail Counter	>= 75 Counts				
					P07BF Enable Calibration	= 1 Boolean		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P07C0		
Transmission Input Speed Sensor (TISS)	P07C0	Input/Turbine Speed Sensor A Circuit High	TISS Analog Signal Voltage	>= 4.75 Volts			>= 5.00E-02 sec	One Trip
			P07C0 Status is not	= Test Failed This Key On or Fault Active				
			If the above conditons have been met, increment the P07C0 Fail Counter					
			DTC P07C0 Sets when the Fail Counter	>= 75 Counts				
					P07C0 Enable Calibration	= 1 Boolean		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P07BF		
Tap Up Tap Down Switch (TUTD)	P0815	Upshift Switch Circuit	Fail Case 1 Tap Up Switch Stuck in the Up Position in Range 1 Enabled	= 1 Boolean				Special No MIL
			Tap Up Switch Stuck in the Up Position in Range 2 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 3 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 4 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 5 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 6 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Neutral Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Park Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Reverse Enabled	= 0 Boolean				
			Tap Up Switch ON	= TRUE Boolean			>= 1 Fail Time (Sec)	
			Fail Case 2 Tap Up Switch Stuck in the Up Position in Range 1 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 2 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 3 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 4 Enabled	= 1 Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Tap Up Switch Stuck in the Up Position in Range 5 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 6 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Neutral Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Park Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Reverse Enabled	= 0 Boolean				
			Tap Up Switch ON NOTE: Both Failcase1 and Failcase 2 Must Be Met	= TRUE Boolean			>= 120 Fail Time (Sec)	
					Time Since Last Range Change	>= 1 Enable Time (Sec)		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0815 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0816, P0826, P182E, P1876, P1877, P1915, P1761 ECM: None		
Tap Up Tap Down Switch (TUTD)	P0816	Downshift Switch Circuit	Fail Case 1 Tap Down Switch Stuck in the Down Position in Range 1 Enabled	= 1 Boolean				Special No MIL
			Tap Down Switch Stuck in the Down Position in Range 2 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 3 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 4 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 5 Enabled	= 1 Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Tap Down Switch Stuck in the Down Position in Range 6 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range Neutral Enabled	= 0 Boolean				
			Tap Down Switch Stuck in the Down Position in Range Park Enabled	= 0 Boolean				
			Tap Down Switch Stuck in the Down Position in Range Reverse Enabled	= 0 Boolean				
			Tap Down Switch ON	= TRUE Boolean			>= 1 sec	
			Fail Case 2 Tap Down Switch Stuck in the Down Position in Range 1 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 2 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 3 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 4 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 5 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Range 6 Enabled	= 1 Boolean				
			Tap Down Switch Stuck in the Down Position in Neutral Enabled	= 0 Boolean				
			Tap Down Switch Stuck in the Down Position in Park Enabled	= 0 Boolean				
			Tap Down Switch Stuck in the Down Position in Reverse Enabled	= 0 Boolean				
			Tap Down Switch ON NOTE: Both Failcase1 and Failcase 2 Must Be Met	= TRUE Boolean			>= 120 sec	
					Time Since Last Range Change	>= 1 Enable Time (Sec)		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0816 Status is	≠ Test Failed This Key On or Fault Active		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0815, P0826, P182E, P1876, P1877, P1915, P1761 ECM: None		
Tap Up Tap Down Switch (TUTD)	P0826	Up and Down Shift Switch Circuit	TUTD Circuit Reads Invalid Voltage	= TRUE Boolean			>= 60 Fail Time (Sec)	Special No MIL
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0826 Status is	≠ Test Failed This Key On or Fault Active		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P1761 ECM: None		
Variable Bleed Solenoid (VBS)	P0961	Pressure Control (PC) Solenoid A Control Circuit Rationality Test (Line Pressure VBS)	The HWIO reports an invalid voltage (out of range) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0962	Pressure Control (PC) Solenoid A Control Circuit Low Voltage (Line Pressure VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 1.5 Fail Time (Sec) out of 1.875 Sample Time (Sec)	One Trip
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0963	Pressure Control (PC) Solenoid A Control Circuit High Voltage (Line Pressure VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for	>= 9 Volts <= 31.990234 Volts >= 400 RPM <= 7500 RPM >= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0966	Pressure Control (PC) Solenoid B Control Circuit Low Voltage (C35R VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for P0966 Status is not	>= 9 Volts <= 31.990234 Volts >= 400 RPM <= 7500 RPM >= 5 Sec = Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0967	Pressure Control (PC) Solenoid B Control Circuit High Voltage (C35R VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for	>= 9 Volts <= 31.990234 Volts >= 400 RPM <= 7500 RPM >= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P0967 Status is not = Test Failed This Key On or Fault Active			
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0970	Pressure Control (PC) Solenoid C Control Circuit Low Voltage (C456/CBR1 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P0970 Status is not = Test Failed This Key On or Fault Active			
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0971	Pressure Control (PC) Solenoid C Control Circuit High Voltage (C456/CBR1 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P0971 Status is not = Test Failed This Key On or Fault Active			
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		
Shift Solinoid	P0973	Shift Solenoid A Control Circuit Low (Mode 2 Solenoid)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 1.2 Fail Time (Sec) out of 1.5 Sample Time (Sec)	One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P0973 Status is not = Test Failed This Key On or Fault Active			
					Ignition Voltage >= 9 Volts			
					Ignition Voltage <= 31.990234 Volts			
					Engine Speed >= 400 RPM			
					Engine Speed <= 7500 RPM			
					Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Shift Solinoid	P0974	Shift Solenoid A Control Circuit High (Mode 2 Solenoid)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 1.2 Fail Time (Sec) out of 1.5 Sample Time (Sec)	Two Trips
					P0974 Status is not = Test Failed This Key On or Fault Active			
					Ignition Voltage >= 9 Volts			
					Ignition Voltage <= 31.990234 Volts			
					Engine Speed >= 400 RPM			
					Engine Speed <= 7500 RPM			
					Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Tap Up Tap Down Switch (TUTD)	P1761	Tap Up and Down switch signal circuit (rolling count)	Rolling count value received from BCM does not match expected value	= TRUE Boolean			>= 3 Fail Counter > 10 Sample Timer (Sec)	Special No MIL
					Tap Up Tap Down Message Health = TRUE Boolean			
					Engine Speed Lo >= 400 RPM			
					Engine Speed Hi <= 7500 RPM			
					Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria		Threshold Value		Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
Internal Mode Switch (IMS)	P182E	Internal Mode Switch - Invalid Range	Fail Case 1											One Trip
				Current range	=	Transition 1 (bit state 1110) Range								
				Previous range	≠	CeTRGR_e_PRNDL_Drive 6 Range								
				Previous range	≠	CeTRGR_e_PRNDL_Drive 5 Range								
				Range Shift State	=	Range Shift Completed ENUM								
				Absolute Attained Gear Slip	<=	50 rpm								
				Attained Gear	<=	Sixth								
				Attained Gear	>=	First								
				Throttle Position Available	=	TRUE								
				Throttle Position	>=	8.000183105 pct								
				Output Speed	>=	200 rpm								
				Engine Torque	>=	50 Nm								
				Engine Torque	<=	8191.75 Nm								
				If the above conditions are met then Increment Fail Timer							>=	1	Fail Seconds	
				If Fail Timer has Expired then Increment Fail Counter							>=	5	Fail Counts	
			Fail Case 2	Output Speed	<=	70 rpm								
				The following PRNDL sequence events occur in this exact order:										
				PRNDL state	=	Drive 6 (bit state 0110) Range								
				PRNDL state = Drive 6 for	>=	1 Sec								
				PRNDL state	=	Transition 8 (bit state 0111) Range								
				PRNDL state	=	Drive 6 (bit state 0110) Range								
				PRNDL state	=	Transition 1 (bit state 1110) Range								
				Above sequencing occurs in	<=	1 Sec								
				Neutral Idle Mode	=	Inactive								
				If all conditions above are met Increment delay Timer										
				If the below two conditions are met Increment Fail Timer							>=	3	Fail Seconds	
				delay timer	>=	1 Sec								
				Input Speed	>=	400 Sec								
				If Fail Timer has Expired then Increment Fail Counter							>=	2	Fail Counts	
			Fail Case 3											
				Current range	=	Transition 13 (bit state 0010) Range	Previous range	≠	CeTRGR_e_PRNDL_Drive3				
				Engine Torque	>=	-8192 Nm	Previous range	≠	CeTRGR_e_PRNDL_Drive2				
				Engine Torque	<=	8191.75 Nm	IMS is 7 position configuration	=	0 Boolean				
				If the above conditions are met then, Increment Fail Timer			If the "IMS 7 Position config" = 1 then the "previous range" criteria above must also be satsified when the "current range" = "Transition 13"				>=	0.225	Seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If Fail Timer has Expired then Increment Fail Counter				>= 15 Fail Counts	
			Fail Case 4					
			Current range	= Transition 8 (bit state 0111) Range	Disable Fail Case 4 if last positive range was Drive 6 and current range is transition 8			
			Inhibit bit (see definition)	= FALSE	Set inhibit bit true if PRNDL = 1100 (rev) or 0100 (Rev-Neu transition 11) Set inhibit bit false if PRNDL = 1001 (park)			
			Steady State Engine Torque	>= 100 Nm				
			Steady State Engine Torque	<= 8191.75 Nm				
			If the above conditions are met then Increment Fail Timer				>= 0.225 Seconds	
			If the above Condtions have been met, Increment Fail Counter				>= 15 Fail Counts	
			Fail Case 5					
			Throttle Position Available	= TRUE Boolean				
			The following PRNDL sequence events occur in this exact order:					
			PRNDL State	= Reverse (bit state 1100) Range				
			PRNDL State	= Transition 11 (bit state 0100) Range				
			PRNDL State	= Neutral (bit state 0101) Range				
			PRNDL State	= Transition 11 (bit state 0100) Range				
			Above sequencing occurs in Then delay timer increments	<= 1 Sec				
			Delay timer	>= 5 sec				
			Range Shift State	= Range Shift Complete				
			Absolute Attained Gear Slip	<= 50 rpm				
			Attained Gear	<= Sixth				
			Attained Gear	>= First				
			Throttle Position	>= 8.000183105 pct				
			Output Speed	>= 200 rpm				
			If the above conditions are met Increment Fail Timer				>= 20 Seconds	
			Fail Case 6					
			Current range	= Illegal (bit state 0000 or 1000 or 0001)	A Open Circuit Definition (flag set false if the following conditions are met):			
			and		Current Range	≠ Transition 11 (bit state 0100)		
			A Open Circuit (See Definition)	= FALSE Boolean	or			
					Last positive state	≠ Neutral (bit state 0101)		
					or			
					Previous transition state	≠ Transition 8 (bit state 0111)		
					Fail case 5 delay timer	= 0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the above Condtions are met then, Increment Fail timer				>= 6.25 Seconds	
			Fail Case 7 Current PRNDL State and Previous PRNDL state Input Speed Reverse Trans Ratio Reverse Trans Ratio If the above Condtions are met then, Increment Fail timer	= PRNDL circuit ABCP = 1101 Range = PRNDL circuit ABCP =1111 Range >= 150 RPM <= 2.736938477 ratio >= 3.149047852 ratio			>= 6.25 Seconds	
			P182E will report test fail when any of the above 7 fail cases are met		Ignition Voltage Lo >= 9 Volts Ignition Voltage Hi <= 31.990234 Volts Engine Speed Lo >= 400 RPM Engine Speed Hi <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec Engine Torque Signal Valid = TRUE Boolean		
					MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P07C0, P07BF, P077C, P077D ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Internal Mode Switch (IMS)	P1915	Internal Mode Switch Does Not Indicate Park/Neutral (P/N) During Start	PRNDL State is The following events must occur Sequentially Initial Engine speed	≠ Park or Neutral Enumeration <= 50 RPM			>= 0.25 Enable Time (Sec)	One Trip
			Then Engine Speed Between Following Cals Engine Speed Lo Hist Engine Speed Hi Hist	 >= 50 RPM <= 480 RPM			>= 0.06875 Enable Time (Sec)	
			Then Final Engine Speed Final Transmission Input Speed	 >= 650 RPM >= 40 RPM			>= 1.25 Fail Time (Sec)	
					DTC has Ran this Key Cycle? Ignition Voltage Lo Ignition Voltage Hi	= FALSE Boolean >= 6 V <= 31.990234 V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Ignition Voltage Hyst High (enables above this value)	>= 5 V		
					Ignition Voltage Hyst Low (disabled below this value)	<= 2 V		
					Transmission Output Speed	<= 90 rpm		
					P1915 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P2534	Ignition Switch Run/Start Position Circuit Low	TCM Run crank active (based on voltage thresholds below)	= FALSE Boolean				One Trip
			Ignition Voltage High Hyst (run crank goes true when above this value)	5 Volts			>= 280 Fail Counts (25ms loop)	
			Ignition Voltage Low Hyst (run crank goes false when below this value)	2 Volts			Out of 280 Sample Counts (25ms loop)	
					ECM run/crank active status available	= TRUE Boolean		
					ECM run/crank active status	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P2535	Ignition Switch Run/Start Position Circuit High	TCM Run crank active (based on voltage thresholds below)	= TRUE Boolean				One Trip
			Ignition Voltage High Hyst (run crank goes true when above this value)	5 Volts			>= 280 Fail Counts (25ms loop)	
			Ignition Voltage Low Hyst (run crank goes false when below this value)	2 Volts			Out of 280 Sample Counts (25ms loop)	
					ECM run/crank active status available	= TRUE Boolean		
					ECM run/crank active status	= FALSE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2714	Pressure Control (PC) Solenoid D Stuck Off [CB26]	Fail Case 1 Case: Steady State 2nd Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 3rd gear					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If attained Gear = 3rd for Time	>= Table Based Time Please see Table 2 in Supporting Documents Enable Time (Sec)				
			If Above Conditions have been met					
			Increment 2nd gear fail count				>= 3 2nd Gear Fail Count	
			and CB26 Fail Count				or >= 14 CB26 Fail Count	
			Fail Case 2 Case: Steady State 6th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear = 5th For Time	>= Table Based Time Please see Table 2 in Supporting Documents Enable Time (Sec)				
			If Above Conditions have been met, Increment 5th gear fail counter				>= 3 5th Gear Fail Count	
			and CB26 Fail Count				or >= 14 CB26 Fail Count	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 0 RPM		
					A OR B			
					(A) Output speed enable	>= 100 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2715	Pressure Control (PC) Solenoid D Stuck On [CB26] (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 13 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized Clutch				
			Primary Offgoing Clutch Pressure Command Status	= exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 50 RPM				
			If above coditons are true, increment appropriate Fail 1 Timers Below:					
			fail timer 1 (2-1 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (2-1 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (2-3 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (2-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (2-4 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (2-4 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (6-4 shifting with throttle)	>= 0.400390625 Fail Time (Sec)				
			fail timer 1 (6-4 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (6-5 shifting with throttle)	>= 0.700195313 Fail Time (Sec)				
			fail timer 1 (6-5 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			2nd gear fail counter				>= 3 Fail Counter From 2nd Gear OR	
			6th gear fail counter				>= 3 Fail Counter From 6th Gear OR	
			total fail counter				>= 3 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 °C		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 200 RPM		
					input speed limit for TUT	>= 200 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2715	Pressure Control (PC) Solenoid D Stuck On [CB26] (Steady State)	Fail Case 1 Case: Steady State 1st					One Trip
			Attained Gear slip	>= 400 RPM				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec)				
			Intrusive test: (CBR1 clutch exhausted)					
			Gear Ratio	<= 3.112670898				
			Gear Ratio	>= 2.705322266				
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 5 Fail Count in 1st Gear or	
							>= 5 Total Fail Counts	
			Fail Case 2 Case: Steady State 3rd Gear					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 3.112670898				
			Gear Ratio	>= 2.705322266				
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 3rd Gear or >= 5 Total Fail Counts	
			Fail Case 3 Case: Steady State 4rd Gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C1234 clutch exhausted)					
			Gear Ratio	<= 0.798217773				
			Gear Ratio	>= 0.693725586				
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 4th Gear or	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 5 Total Fail Counts	
			Fail Case 4 Case: Steady State 5th Gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 0.798217773				
			Gear Ratio	>= 0.693725586				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 5th Gear or >= 5 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 100 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 10.00061 Pct		
					if Attained Gear=1st FW Engine Torque Enable	>= 45 Nm		
					if Attained Gear=1st FW Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2720	Pressure Control (PC) Solenoid D Control Circuit Low (CB26 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2770 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2721	Pressure Control (PC) Solenoid D Control Circuit High (CB26 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2721 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 9 Volts		
					Ignition Voltage	<= 31.990234 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2723	Pressure Control (PC) Solenoid E Stuck Off	Fail Case 1 Case: Steady State 1st Gear Gear slip Intrusive test: commanded 2nd gear If attained Gear ≠ 2nd for Time If Above Conditions have been met, Increment 1st gear fail counter and C1234 fail counter	>= 400 RPM >= Please refer to Table 3 in Supporting Documents Shift Time (Sec)			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec) >= 2 1st Gear Fail Count or >= 14 C1234 Clutch Fail Count	One Trip
			Fail Case 2 Case: Steady State 2nd Gear Gear slip Intrusive test: commanded 3rd gear If attained Gear ≠ 3rd for Time If Above Conditions have been met, Increment 2nd gear fail counter and C1234 fail counter	>= 400 RPM >= Please refer to Table 3 in Supporting Documents Shift Time (Sec)			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec) >= 2 2nd Gear Fail Count or >= 14 C1234 Clutch Fail Count	
			Fail Case 3 Case: Steady State 3rd Gear Gear slip Intrusive test: commanded 4th gear If attained Gear ≠ 4th for time If Above Conditions have been met, Increment 3rd gear fail counter and C1234 fail counter	>= 400 RPM >= Please refer to Table 3 in Supporting Documents Shift Time (Sec)			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec) >= 2 3rd Gear Fail Count or >= 14 C1234 Clutch Fail Count	
			Fail Case 4 Case: Steady State 4th Gear					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear If attained Gear = 5th For Time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			If Above Conditions have been met, Increment 4th gear fail counter				>= 3 4th Gear Fail Count	
			and C1234 fail counter				>= 14 or C1234 Clutch Fail Count	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT A OR B	>= 0 RPM		
					(A) Output speed enable	>= 100 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Variable Bleed Solenoid (VBS)	P2724	Pressure Control (PC) Solenoid E Stuck On (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 10 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized Clutch				
			Primary Offgoing Clutch Pressure Command Status	= exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 50 RPM				
			If the above conditions are true increment appropriate Fail 1 Timers Below:					
			fail timer 1 (2-6 shifting with throttle)	>= 0.400390625 sec				
			fail timer 1 (2-6 shifting without throttle)	>= 0.5 sec				
			fail timer 1 (3-5 shifting with throttle)	>= 0.400390625 sec				
			fail timer 1 (3-5 shifting without throttle)	>= 0.5 sec				
			fail timer 1 (4-5 shifting with throttle)	>= 0.400390625 sec				
			fail timer 1 (4-5 shifting without throttle)	>= 0.5 sec				
			fail timer 1 (4-6 shifting with throttle)	>= 0.400390625 sec				
			fail timer 1 (4-6 shifting without throttle)	>= 0.5 sec				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			2nd gear fail counter				>= 3 Fail Counter From 2nd Gear	
			3rd gear fail counter				>= 3 Fail Counter From 3rd Gear	
			4th gear fail counter				>= 3 Fail Counter From 4th Gear	
			total fail counter				>= 3 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Output Speed Sensor fault = FALSE Boolean Command / Attained Gear ≠ 1st Boolean High Side Driver ON = TRUE Boolean output speed limit for TUT >= 200 RPM input speed limit for TUT >= 200 RPM PRNDL state defaulted = FALSE Boolean IMS Fault Pending = FALSE Boolean Service Fast Learn Mode = FALSE Boolean HSD Enabled = TRUE Boolean			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2724	Pressure Control (PC) Solenoid E Stuck On (Steady State)	Fail Case 1 Case: 5th Gear Max Delta Output Speed Hysteresis Min Delta Output Speed Hysteresis If the Above is True for Time Intrusive test: (C35R clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	 >= Table Based value Please Refer to Table 22 in supporting documents rpm/sec >= Table Based value Please Refer to Table 23 in supporting documents rpm/sec >= Table Based Time Please Refer to Table 17 in supporting documents Sec <= 1.529052734 >= 1.328979492			>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 5th Gear OR >= 3 Total Fail Counts	One Trip
			Fail Case 2 Case: 6th Gear					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.529052734				
			Gear Ratio	>= 1.328979492				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 6th Gear OR >= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 100 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 9 Volts		
					Ignition Voltage Hi	<= 31.990234 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 10.00061 Pct		
					if Attained Gear=1st FW Engine Torque Enable	>= 45 Nm		
					if Attained Gear=1st FW Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2729	Pressure Control (PC) Solenoid E Control Circuit Low (C1234 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2729 Status is not Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for	= Test Failed This Key On or Fault Active >= 9 Volt <= 31.990234 Volt >= 400 RPM <= 7500 RPM >= 5 Sec	
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2730	Pressure Control (PC) Solenoid E Control Circuit High (C1234 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2730 Status is not Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for	= Test Failed This Key On or Fault Active >= 9 Volt <= 31.990234 Volt >= 400 RPM <= 7500 RPM >= 5 Sec	
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Variable Bleed Solenoid (VBS)	P2763	Torque Converter Clutch Pressure High	The HWIO reports a low pressure/high voltage (open or power short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					P2763 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 9 Volt		
					Ignition Voltage	<= 31.990234 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High Side Driver Enabled	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0659 ECM: None		
Variable Bleed Solenoid (VBS)	P2764	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low	The HWIO reports a high pressure/low voltage (ground short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	One Trip
					P2764 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 9 Volt		
					Ignition Voltage	<= 31.990234 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High Side Driver Enabled	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0659 ECM: None		
Communication	U0073	Controller Area Network Bus Communication Error	CAN Hardware Circuitry Detects a Low Voltage Error	= TRUE Boolean			>= 62 Fail counts (≈ 10 seconds)	One Trip
			Delay timer	>= 0.1125 sec			Out of 70 Sample Counts (≈ 11 seconds)	
					Stabilization delay	>= 3 sec		
					Ignition Voltage	>= 9 Volt		
					Ignition Voltage	<= 31.990234 Volt		
					Power Mode	= Run		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Communication	U0100	Lost Communications with ECM (Engine Control Module)	CAN messages from ECM are not received by the TCM	= TRUE Boolean			>= 12 sec	One Trip
					Stabilization delay	>= 3 sec		
					Ignition Voltage	>= 9 Volt		
					Ignition Voltage	<= 31.990234 Volt		
					Power Mode	= Run		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: U0073 ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	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 Ω 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 Illum.
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.	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 Ω 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 Illum.
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.	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 attained gear slip 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 ≤ 100.0 RPM < 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 Illum.
Longitudinal Acceleration Sensor Circuit Low	C1252	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.	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 Ω 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 Illum.
Longitudinal Acceleration Sensor Circuit High	C1253	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.	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 Ω 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 Illum.
Longitudinal Acceleration Sensor Performance	C1254	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.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	≥ 0.5300 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 attained gear slip 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 ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 15.0 KPH ≤ 200.0 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 ≥ 75.0 seconds out of region 1 sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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		
			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 attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal	≥ 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 ≤ 100.0 RPM ≥ 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 Illum.
					acceleration signal) 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	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = 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 Illum.
					P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip 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 = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 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	≥ 0.0000 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	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = 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 Illum.
					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 attained gear slip 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	= TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 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 Illum.
System Voltage Performance	P0561	Detects a low performing 12V battery system. This diagnostic reports the DTC when the absolute value of the difference between the battery voltage and the run/ crank voltage exceeds a calibrated value.	Run Crank voltage low and high	ABS(Battery voltage - Run Crank voltage) > 3.00	Battery voltage B+ line present = TRUE Battery voltage low and high diag enable = TRUE Run Crank voltage	1.00 1.00 Voltage ≥ 5.00 volts	40 failures out of 50 samples 100 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary 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.	
				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 Illum.
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.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			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 Illum.
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 a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system 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)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 8.00 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent or 10 counts continuous; 100 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_MainCPU_SOH_FltEnbld is: 0 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	35.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 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			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 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 Illum.
			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)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 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			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 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.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Actuator Supply Voltage Circuit Low	P0658	Controller specific output driver circuit diagnoses the high sided driver circuit 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 monitor enable high side drive ON service mode $04 not active service fast learn not active P0658 fault active P0658 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	fail count ≥ 6 counts out of sample count ≥ 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 Illum.
Transmission Range (TR) Switch Circuit Low Voltage	P0707	Diagnoses the internal range sensor circuit A and wiring for a ground short circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to ground.	≤ 8.789 % duty cycle ≥ 8.789 % duty cycle ≤ 0.5 Ω impedance between signal and controller ground	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean ≥ 9.00 volts = CeTRGD_e_VoltDirctProp	fail time ≥ 0.500 seconds out of sample time ≥ 1.500 seconds battery voltage time ≥ 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range (TR) Switch Circuit High Voltage	P0708	Diagnoses the internal range sensor circuit A and wiring for a short to voltage circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to power.	≥ 91.190 % duty cycle ≤ 91.190 % duty cycle ≤ 0.5 Ω impedance between signal and controller power	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean ≥ 9.00 volts = CeTRGD_e_VoltDirctProp	fail time ≥ 1.800 seconds out of sample time ≥ 2.250 seconds battery voltage time ≥ 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature (TFT) Sensor Performance	P0711	The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sesnor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sesnor, and, raw transmission fluid temperature sesnor signal stuck in valid range.	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	≤ 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	≥ -40.0 °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 Illum.
						EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	≥ 80.0 °C			sample count ≥ 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time fail time ≥ 8.0 seconds out of sample time ≥ 12.0 seconds	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					intermittent test enable propulsion system active	= 1 Boolean = TRUE		
			raw transmission fluid temperature - previous	≤ 0.0000 °C			fail time ≥ 300.0 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			raw transmission fluid temperature, update rate 100 milliseconds, update fail time		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 ≥ -40.0 °C ≤ 150.0 °C	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 Illum.
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 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts	fail time ≥ 5.00 seconds out of sample time ≥ 6.00 seconds 1 seconds update rate battery voltage in range time ≥ 0.100 seconds run crank voltage in range time ≥ 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	≥ 49,411,396.0 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 Illum.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.	delta raw transmission input speed delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	≥ 2,000.0 RPM	service mode $04 active diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on last valid raw transmission input speed OR valid raw transmission input speed (before drop event) last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as (delta delta raw transmission input speed AND raw transmission input speed) raw transmission output speed accelerator pedal position engine torque engine torque transmission hydraulic pressure available: engine speed DTCs not fault active	= FALSE = 1 Boolean = FALSE = FALSE = FALSE ≥ 160.0 RPM ≥ 160.0 RPM ≤ 320.0 RPM > 160.0 RPM ≥ 254.0 RPM ≥ 5.0 % ≤ 8,191.9 Nm ≥ 30.0 Nm ≥ 400.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate raw transmission input speed time ≥ 2.000 seconds stability time ≥ 0.100 seconds engine speed time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							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 Illum.
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 Illum.
					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	≥ 162.0 RPM = FALSE = FALSE = 0 Boolean = 1 Boolean ≥ 400.0 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 Illum.
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 ≥ 25.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period detected = TRUE when: on period on period when direction unknown senor type is directional senor type cailbration	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds = CeTOSR_e_Directional	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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) AND (engine torque accelerator pedal position) 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	= FALSE = 1 Boolean ≠ COMPLETE OR = PARK OR = NEUTRAL OR ≠ no inhibt active AND ≥ 8,192.0 Nm ≥ 100.0 % ≥ 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	fail time ≥ 5.00 seconds high gear OR fail time ≥ 3.50 seconds low gear	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accelerator pedal position hysteresis high	≥ 8.0 %		
					accelerator pedal position hysteresis low)	> 5.0 %		
					TISS enable occurs when:			
					(TISS speed select	= 1 Boolean		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	≤ 8,191.9 RPM		
					AND			
					TISS)	≥ 475.0 RPM		
					OR			
					(TISS speed select	≠ 1 Boolean		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	≤ 8,191.9 RPM		
					AND			
					TISS)	≥ 5,800.0 RPM		
					P0716 test fail this key on	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					PTO check:			
					PTO enable calibration is FALSE	≠ 1 Boolean		
					OR			
					(PTO enable calibration is TRUE	= 1 Boolean		
					AND			
					PTO active)	= TRUE		
					run crank voltage	≥ 5.00 volts	run crank voltage time ≥ 25 milliseconds	
					service fast learn active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	≥ 9.00 volts ≥ -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 400.0 RPM AcceleratorPedalFailure 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 Illum.
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.	4WD low fail threshold: delta raw transmission output speed OR NOT 4WD low fail threshold, update fail time, delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate	≥ 700.0 RPM ≥ 700.0 RPM	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 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 Illum.
					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 (TISS/TOSS has single power supply calibration AND raw transmission input speed)	= CeTRGR_e_PRNDL_Neutral = CeTRGR_e_PRNDL_Transitional1 N-D transitional = CeTRGR_e_PRNDL_Transitional4 R-N transitional ≥ 250.0 RPM ≥ 250.0 RPM ≤ 4,095.9 RPM ≥ 160.0 RPM = 0 Boolean = 0.0 RPM	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 Illum.
					select delta RPM fail theshold: (4WD low state AND $WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold last valid raw transmission output speed OR valid raw transmission output speed (before drop event) last valid raw transmission output speed updates very 25 milliseconds when stablity time complete as long as (delta delta raw transmission output speed AND raw transmission output speed) transmission hydraulic pressure available: engine speed DTCs not fault active	= TRUE = TRUE > 89.0 RPM > 89.0 RPM ≤ 140.0 RPM ≥ 89.0 RPM ≥ 400.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	raw transmission output speed time ≥ 2.00 seconds stability time ≥ 0.100 seconds 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 Illum.
Torque Converter Clutch (TCC) System Performance - GF9 specific	P0741	The GF9 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	while control valve test time timing down: rate of change of torque convert slip speed = (ABS (current loop value torque convert slip speed - previous loop value torque convert slip speed) / 25 milliseconds) when clutch select valve soleniod multiplexed to TCC hydraulic AND torque convert slip speed = ABS(engine speed - transmission input shaft speed) THEN increment fail time 25 millisecond update rate	≥ **P0741 (GF9 specific) torque convert derivative slip speed fail threshold** see supporting tables ≤ **P0741 (GF9 specific) TCC slip speed crash RPM**	 diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed service fast learn active battery voltage run crank voltage P281B falut active P281D falut active P281E falut active PRNDL PRNDL PRNDL transmission fluid temperature	 = 1 Boolean = 1 Boolean = 1 Boolean ≥ 400.0 RPM = FALSE ≥ 9.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE ≠ PARK ≠ NEUTRAL ≠ REVERSE ≥ -6.66 °C	failt ime ≥ 0.250 seconds, increment fail count fail count ≥ 4 counts 25 millisecond update rate engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table 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 Illum.
					transmission fluid temperature	≤ 130.00 °C		
					accelerator pedal position	≥ 0.00 %		
					accelerator pedal position	≤ 1.00 %		
					vehicle speed	≥ 3.0 KPH		
					vehicle speed	≤ 9.5 KPH		
					TCC command mode	= OFF		
					break latch state (clutch select valve solenoid control)	≠ disabled (clutch select valve transitioning)		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.00 °C		
					engine torque	≥ 55.0 Nm		
					engine torque	≤ 800.0 Nm		
					P0741 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		
					(misfire requests TCC off OR			
					misfire TCC off calibration)	= 0 Boolean		
					(clucth control solenoid stuck on OR solenoid stuck OFF intrusive shift active)	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0746 fault pending P0747 fault pending P0776 fault pending P0777 fault pending P0796 fault pending P0797 fault pending P2714 fault pending P2715 fault pending P2723 fault pending P2724 fault pending P2732 fault pending P2733 fault pending P2820 fault pending P2821 fault pending vehicle speed accelerator pedal position hysteresis when: break latch state (clutch select valve solenoid) previous break latch state (clutch select valve solenoid) set stuck on test time and begin time down, stuck on test time must time down from calibration value to zero (0.0) seconds break latch state AND previous break latch state THEN initialize control valve test time, control valve test time must time down from calibration value to zero (0.0) seconds	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≤ 8.0 KPH ≥ 4.0 % > 1.0 % = disabled (clutch select valve not transitioning) = complete (clutch select valve transition complete) = **P0741 stuck on test time** see supporting tables = clutch select valve solenoid mutliplexed to TCC hydraulic = disabled (clutch select valve not transitioning) = 2.50 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					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	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			available: engine speed enable C1 clutch slip speed fail compare when: diagnostic clutch test C1 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C1 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C1 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 C1 CB123456, or, GR10 C1 CB123456R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C1 clutch pressured map 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 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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C1 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	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 Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 not power down shift, C1 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed	≥ 400.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					transmission output shaft speed	≥ 89.0 RPM		
					set solenoid stuck on test trigger to TRUE when:			
					clutch pressure control solenoid stuck off stuck intrusive shift request	= FALSE		
					startle mitigation active (see startle mitigation active NOTE below)	= FALSE		
					clutch control solenoid test state	≠ TIE UP TEST TEST STATE		
					clutch control solenoid test state (see clutch control solenoid test state NOTE below)	≠ TIE UP TEST HOLD		
					initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, or, GR10 C1 CB123456R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C1 off going clutch pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C1 off going clutch pressure time ≥ **P0747 C1 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0747 C1 clutch exhaust delay time open throttle power on up shift OR **P0747 C1 clutch exhaust delay time garage shift** OR **P0747 C1 clutch exhaust delay time closed throttle down shift** OR **P0747 C1 clutch exhaust delay time negative torque up shift** OR **P0747 C1 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 690.0 kPa ≥ 2,100.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C1 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 690.0 kPa ≥ 400.0 kPa ≥ 690.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					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	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			available: engine speed enable C2 clutch slip speed fail compare when: diagnostic clutch test C2 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C2 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C2 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 C2 CB29 or GR10 C2 CB128910R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C2 clutch pressured map 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 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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C2 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	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 Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 not power down shift, C2 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C2 CB29 or GR10 C2 CB128910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state	= TEST WAITING		
					OR			
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C2 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable)	= 1 Boolean		
					OR			
					C2 off going clutch pressure	≤ 350.0 kPa	for C2 off going clutch pressure time ≥ **P0777 C2 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0777 C2 clutch exhaust delay time open throttle power on up shift OR **P0777 C2 clutch exhaust delay time garage shift** OR **P0777 C2 clutch exhaust delay time closed throttle down shift** OR **P0777 C2 clutch exhaust delay time negative torque up shift** OR **P0777 C2 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 800.0 kPa ≥ 800.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C2 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 800.0 kPa ≥ 800.0 kPa ≥ 800.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Ω 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 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Ω 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 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					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	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			available: engine speed enable C3 clutch slip speed fail compare when: diagnostic clutch test C3 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C3 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C3 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 C3 CB38, or, GR10 C3 CB123456R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C3 clutch pressured map 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 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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C3 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	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 Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 not power down shift, C3 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, or, GR10 C3 CB123456R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state OR	= TEST WAITING		
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C3 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable) OR	= 1 Boolean		
					C3 off going clutch pressure	≤ 350.0 kPa	for C3 off going clutch pressure time ≥ **P0797 C3 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0797 C3 clutch exhaust delay time open throttle power on up shift OR **P0797 C3clutch exhaust delay time garage shift** OR **P0797 C3 clutch exhaust delay time closed throttle down shift** OR **P0797 C3 clutch exhaust delay time negative torque up shift** OR **P0797 C3 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 500.0 kPa ≥ 500.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C3 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 500.0 kPa ≥ 500.0 kPa ≥ 500.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Ω 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 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Ω 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 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active.	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 P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = 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 = 0 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds run crank voltage time ≥ 25 milliseconds	Emissions Neutral Diagnostic – 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 P1761 fault active P0826 fault active P0826 test fail this key on	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time 2 ≥ 120.00 seconds run crank voltage time ≥ 25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active.	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 P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds run crank voltage time ≥ 25 milliseconds ≥ 1.00 seconds	Emissions Neutral Diagnostic – 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 P1761 fault active P0826 fault active P0826 test fail this key on	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time 2 ≥ 120.00 seconds run crank voltage time ≥ 25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range.	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 Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Low Voltage	P0962	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit High Voltage	P0963	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29 or 10 speed CB128910R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low Voltage	P0966	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit High Voltage	P0967	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Low Voltage	P0970	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit High Voltage	P0971	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	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 before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	100 / 16 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	8 / 16 counts continuous; 12.5 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 Illum.
Internal Control Module Redundant Memory Performance	P16F3	The diagnostic monitor is a rationalization of command values: command clutch pressures and command gear. The monitor is broken up into two fault detection routines, command pressure (tie up) fault detection and command gear/shift fault detection. 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 rational, one or more of	command pressure (tie up) fault detection minimum # of clutches ON by attained gear and by comanded gear, take lower of the 2 values, where attained gear is the current operating gear and command gear is the targetted value to transtion toward see **9 speed transmission clutch definition and gear state to clutch map** and **10 speed transmission clutch definition and gear state to clutch map** attached supporting tables for clutch 1 through clutch 7 definition and gear state to clutch map	≤ **NumClchTieUp** See Attached Supporting Tables	Reduandant Memory Command Pressure Enable Calibraiton Not Reduandant Memory Command Pressure Enable Calibraiton No traction event in progress: ABS((driven wheel speed - non-drive wheel speed) / driven wheel speed) 25 millisecond derivative TOSS RPM, (TOSS delta 25 millisecond loop to 25 milsecond loop) / 25 millisecond for time Clutch 1 hydraulic volume fill factor Clutch 2 hydraulic volume fill factor Clutch 3 hydraulic volume fill factor Clutch 4 hydraulic volume fill factor Clutch 5 hydraulic volume fill factor Clutch 6 hydraulic volume fill factor Clutch 7 hydraulic volume fill factor when clutch is off going (releasing) clutch the commanded clutch pressure equation = ((pressure control solenoid command	= 0 Boolean = 1 Boolean ≥ 0.00 % < 0.750 * **P2D2 Cltch Slip Sum** see attached supporting Table ≥ 0.0500 seconds ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless	single event 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 Illum.
		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 driver accelerator position.			pressure - pressure offset) * regulator valve gain) - regulator valve return spring pressure adaptive when clutch 1 is off going clutch: clutch 1 command pressure clutch 1 state is OFF when: clutch 1 command pressure, else clutch is ON and count clutch 1 toward minimum # of clutches ON when clutch 2 is off going clutch: clutch 2 command pressure clutch 2 state is OFF when: clutch 2 command pressure, else clutch is ON and count clutch 2 toward minimum # of clutches ON when clutch 3 is off going clutch: clutch 3 command pressure	= ((clutch 1 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C1** see attached supporting tables = ((clutch 2 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C2** see attached supporting tables = ((clutch 3 pressure		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						control solenoid command pressure - 177.00) * 1.51) - regulator valve return spring pressure adaptive, kPa		
					clutch 3 state is OFF when: clutch 3 command pressure, else clutch is ON and count clutch 3 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C3** see attached supporting tables		
					when clutch 4 is off going clutch: clutch 4 command pressure	= ((clutch 4 pressure control solenoid command pressure - 160.00) * 2.25) - regulator valve return spring pressure adaptive, kPa		
					clutch 4 state is OFF when: clutch 4 command pressure, else clutch is ON and count clutch 4 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C4** see attached supporting tables		
					when clutch 5 is off going clutch: clutch 5 command pressure	= ((clutch 5 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 5 state is OFF when: clutch 5 command pressure,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					else clutch is ON and count clutch 5 toward minimum # of clutches ON when clutch 6 is off going clutch: clutch 6 command pressure clutch 6 state is OFF when: clutch 6 command pressure, else clutch is ON and count clutch 6 toward minimum # of clutches ON when clutch 7 is off going clutch: clutch 7 command pressure clutch 7 state is OFF when: clutch 7 command pressure, else clutch is ON and count clutch 7 toward minimum # of clutches ON service fast learn not active	**P2D2 Decel Pressure - ≤ C5** see attached supporting tables = ((clutch 6 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C6** see attached supporting tables = ((clutch 7 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C7** see attached supporting tables		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active: P0658, P2670			
			command gear/shift fault detection 1st gear commanded and vehicle seed OR 2nd gear commanded and vehicle seed OR 3rd gear commanded and vehicle seed OR 4th gear commanded and vehicle seed OR 5th gear commanded and vehicle seed OR 6th gear commanded and vehicle seed OR 7th gear commanded and vehicle seed OR 8th gear commanded and	 > 66.07 KPH > 93.71 KPH > 102.86 KPH > 126.66 KPH > 161.11 KPH > 214.25 KPH > 309.81 KPH	Reduandant Memory Command Gear Enable Calibraiton Not Reduandant Memory Command Gear Enable Calibraiton service fast learn not active no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active:	= 0 Boolean = 1 Boolean	command gear fail event count ≥ 3 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			vehicle seed OR 9th gear commanded and vehicle seed OR 10th gear commanded and vehicle seed THEN increment command gear fail event count and abort commanded gear and delay for time before next fail evaluation	> 414.73 KPH > 502.12 KPH > 502.12 KPH > 5.00 seconds	P0658, P2670			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Speed Signal Analog to Digital Converter Performance	P16FB	The diagnostic monitor validates the controller calculated transmission output speed sensor data parameters, calculated in multiple paths/subroutines and at different rates. There are multiple transmission output speed sensor data parameters, calculated at rates of 6.25 milliseconds, 12.5 milliseconds and 25 milliseconds. While the same subroutine, a generic “calculate TOSS” is called from different time loops, each call stores that current value of the calculated TOSS to a different memory location. For example, a 12.5 millisecond loop calling “calculate TOSS” stores the calculated TOSS value to a “12.5 millisecond TOSS calculated” data parameter in memory, while a 25 millisecond loop calling “calculate TOSS” stores the calculated TOSS value to a “25 millisecond TOSS calculated” data parameter in memory. The raw transmission output speed sensor	ABS(raw transmission output speed, 6.25 millisecond data parameter - raw transmission output speed, 25 millisecond data parameter) update fail and sample time 25 millisecond update rate	≥ 60.0 RPM	service mode $04 active diagnsotic monitor enable raw transmission output speed, 25 millisecond data parameter raw transmission output speed, 6.25 millisecond data parameter run crank voltage battery voltage	= FALSE = 1 Boolean ≥ 356.0 RPM ≥ 356.0 RPM ≥ 10.00 volts ≥ 10.00 volts	fail time ≥ 8.000 seconds out of sample time ≥ 10.000 seconds 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 Illum.
		signal is diagnosed independently electrically and for performance of this DTC. The transmission output speed sensor data parameters that are calculated at different rates must always be within a negligible difference of each other.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Ω 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 Illum.
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 voltage 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 ≥ 0.300 seconds out of ≥ 0.500 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 Illum.
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 Illum.
					counter must achieve it's fail threshold in less than the time-out time. ********** If vehicle is launched then: Transmission gear ratio Trans 1st gear ratio Trans 1st gear ratio Trans gear ratio not 1st gear Trans gear ratio not 1st gear Valid transmission gear ratio achieved time OR If vehicle is not launched but autostart occurs then: Turbine speed Turbine speed less then above threshold for Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in	 ********** = 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 ≤ 1.120 % of 1st gear ratio ≥ 0.880 % of 1st gear ratio ≤ 1.070 % of gear ratio ≥ 0.930 % of gear ratio ≥ 0.500 seconds ≤ 5.00 RPM ≥ 0.500 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
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	P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 fault active due to unintended deceleration detection, increment unintended deceleration latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	unintended deceleration latent fault fail count ≥ 100 counts 25 millisecond update rate	Type A, 1 Trips
			P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 clutch pressure control solenoid fault active due to clutch stuck on during shift, increment clutch pressure control solenoid latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	clutch pressure control solenoid latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P2802 OR P2803 fault active, increment transmission range sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	transmission range sensor latent fault fail count ≥ 200 counts 25 millisecond update rate	
			P0721 OR P0722 OR P0723 OR P077C OR P077D or P172A fault active, increment transmission output speed sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	transmission output speed sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P0716 OR P0717 OR P0721 OR P07BF OR P07C0 fault active OR		transmission default gear active (emission MIL active) calibration	>	transmission input output speed sensor latent fault fail	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	P077D OR P077D OR P1783 OR P17CE fault active OR P0722 OR P0723 OR P172A test fail this key on OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 Or P172A OR P172B OR P1783 OR P17CE fault pending (fail time ≠ 0) increment transmission input output speed sensor latent fault fail count		CeTRDR_e_DSG_DfltGr OptNone any non-zero (0) option	CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	count ≥ 100 counts 25 millisecond update rate	
			AcceleratorPedalFailure OR EngineTorqueEstInaccurate OR P2534 fault active OR CrankSensor_FA OR P0707 OR P0708 fault active OR test fail this key on OR P2805 fault active OR P0716 OR P0717 OR P07BF OR P07C0 fault active OR P0722 OR P0723 test fail this key on OR P077C OR P077D fault active OR P176C OR P176D OR	= TRUE = TRUE = TRUE	transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option ignition run crank voltage for time	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array > 5.00 volts ≥ 12.5 milliseconds	system latent fault fail count ≥ 100 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			P17CC OR P17CD OR P176B OR P17D6 fault active OR test fail this key on OR P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2733 OR P0746 OR P0776 OR P0796 OR P2714 OR P2723 OR P2732 OR P178F OR P17C4 OR P17C6 OR P172A OR P172B test fail this key on OR P0960 OR P0962 OR P0963 OR P0964 OR P0966 OR P0967 OR P0968 OR P0970 OR P0971 OR P2718 OR P2720 OR P2721 OR P2727 OR P2729 OR P2730 OR P2736 OR P2738 OR P2739 OR P17C5 OR P17D3OR P0721 fault active OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 fault pending (fail time ≠ 0) OR P176B OR P176C OR P176D OR P17CC OR P17CD OR P17D6 OR P1783 OR P178F OR P17C4 OR P17C5 OR P17C6 OR P17CE OR P17D3 OR P172A or P172B fault pending (fail					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			time ≠ 0) OR P1783 fault active OR P1783 fault pending (fail time ≠ 0) update system fault time when system fault time increment system latent fault fail count	≥ 10.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.	rolling count value received from EBCM and expected TCM calculated value not equal OR checksum lateral and longitudinal acceleration CAN frame message value error 50 millisecond update rate	= TRUE = TRUE	enable alive rolling count error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received battery voltage run crank voltage enable checksum error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received normal CAN battery voltage run crank voltage communication enabled DTCs not fault active	 = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = TRUE U0073	alive rolling count errors ≥ 54 out of 9 sample counts 50 millisecond update rate checksum error time ≥ 54.00 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Signal Circuit	P1761	The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame date to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up.	alive rolling count error counter update fail time 100 millisecond update rate	≥ 3 counts	service mode $04 active diagnostic monitor enable run crank voltage up and down shift serial data frame receive occurred when up and down shift serial data frame receive occurred: increment the diagnsotic alive rolling count data value, if the diagnsotic alive rolling count data value, set alive rolling count error to TRUE, when alive rolling count error AND previous alive rolling count error in 10 element arrary buffer, increment alive rolling count error counter	= FALSE = 1 Boolean ≥ 9.00 volts = TRUE ≠ frame alive rolling count data value = TRUE = FALSE	fail time ≥ 10.00 seconds run crank voltage time ≥ 0.100 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sesnor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ********** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration)	= 1 Boolean = CeTNSR_e_NSPD_SinglSpdSnsr **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** see supporting tables	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 Illum.
					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	**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 ≥ 9.00 volts	**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 Illum.
					service fast learn active run crank voltage transmission hydraulic pressure available: engine speed	 ≥ 400.0 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 Illum.
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	≤ 0.2500 volts (≤ 0.5 Ω 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 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	≥ 4.7500 volts (≤ 0.5 Ω 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 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	≠ FORWARD ≠ REVERSE **P17C5 P17D3 intermediate speed ≥ sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type cailbration (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_SinglSpdSnsr ≥ 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 Illum.
Up and Down Shift Switch Performance	P1876	This diagnostic monitor rationalizes the PRNDL, transmission shift lever position, against the state for the tap-up-tap-down (TUTD) enable switch or the manual-up-manual-down (MUMD) enable switch. The switch circuit is considered failing when the PRNDL is in park, reverse or neutral, and the switch circuit is indicating the switch in in the enable, or TUTD/ MUMD function request state. The switch can only be in the enable state when the PRNDL is in the appropriate drive range, for example D9, D8 or D7, but not in park, reverse or neutral.	(PRNDL OR PRNDL OR PRNDL) AND (shift lever range calibration is tap-up-tap-down (TUTD) OR shift lever range calibration is manual-up-manual-down (MUMD)) AND TUTD/MUMD enable request (switch state) update fail time 100 millisecond update rate	= NEUTRAL = REVERSE = PARK = CeTUDR_e_MUMD_ ModeOnly = TRUE	service mode $04 active diagnostic monitor enable (P1876 test fail this key on OR P1876 fault active) PRNDL OR PRNDL OR PRNDL DTCs not test fail this key on DTCs not fault active	= FALSE = 0 Boolean = FALSE = FALSE = NEUTRAL = REVERSE = PARK P0815, P0816, P0826 Transmission Shift Lever Position Validity U0100, P0815, P0816, P0826, P1761, P0707, P0708	fail time ≥ 3.00 seconds, update fail count fail count ≥ 5 counts 100 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 Illum.
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	280 failures out of 280 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 Illum.
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	280 failures out of 280 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 Illum.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit 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 monitor enable high side drive 2 ON P2670 fault active P2670 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	fail count ≥ 6 counts out of sample count ≥ 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 Illum.
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	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 3.00 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 Illum.
		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			available: engine speed enable C4 clutch slip speed fail compare when: diagnostic clutch test C4 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C4 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C4 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 C4 C4, or, GR10 C4 C123467810R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C4 clutch pressured map 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 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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C4 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	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 Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 not power down shift, C4 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed	≥ 400.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					transmission output shaft speed	≥ 89.0 RPM		
					set solenoid stuck on test trigger to TRUE when:			
					clutch pressure control solenoid stuck off stuck intrusive shift request	= FALSE		
					startle mitigation active (see startle mitigation active NOTE below)	= FALSE		
					clutch control solenoid test state	≠ TIE UP TEST TEST STATE		
					clutch control solenoid test state (see clutch control solenoid test state NOTE below)	≠ TIE UP TEST HOLD		
					initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C4 C4, or, GR10 C4 C123467810R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C4 off going clutch pressure	 = TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C4 off going clutch pressure time ≥ **P2715 C4 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2715 C4 clutch exhaust delay time open throttle power on up shift OR **P2715 C4 clutch exhaust delay time garage shift** OR **P2715 C4 clutch exhaust delay time closed throttle down shift** OR **P2715 C4 clutch exhaust delay time negative torque up shift** OR **P2715 C4 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 850.0 kPa ≥ 850.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C4 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 850.0 kPa ≥ 850.0 kPa ≥ 850.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4 or 10 speed C123467810R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4 or 10 speed C123467810R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ s 0.500 econds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4 or 10 speed C123467810R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					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	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			available: engine speed enable C5 clutch slip speed fail compare when: diagnostic clutch test C5 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C5 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C5 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 C5 C57R, or, GR10 C5 C1356789, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C5 clutch pressured map 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 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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C5 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	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 Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 not power down shift, C5 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.400 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed	≥ 400.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					transmission output shaft speed	≥ 89.0 RPM		
					set solenoid stuck on test trigger to TRUE when:			
					clutch pressure control solenoid stuck off stuck intrusive shift request	= FALSE		
					startle mitigation active (see startle mitigation active NOTE below)	= FALSE		
					clutch control solenoid test state	≠ TIE UP TEST TEST STATE		
					clutch control solenoid test state (see clutch control solenoid test state NOTE below)	≠ TIE UP TEST HOLD		
					initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, or, GR10 C5 C1356789, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C5 off going clutch pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C5 off going clutch pressure time ≥ **P2724 C5 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2724 C5 clutch exhaust delay time open throttle power on up shift OR **P2724 C5 clutch exhaust delay time garage shift** OR **P2724 C5 clutch exhaust delay time closed throttle down shift** OR **P2724 C5 clutch exhaust delay time negative torque up shift** OR **P2724 C5 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 703.0 kPa ≥ 703.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C5 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 703.0 kPa ≥ 703.0 kPa ≥ 703.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	shift type is power down shift, C6 clutch slip speed OR shift type is not power down shift, C6 clutch slip speed GF9 specific: Selectable One Way Clutch (SOWC) CBR1 is multiplexed to C6 clutch pressure AND (attained gear OR attained gear) update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM = 1st lock = first free wheel	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed	≥ 400.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					transmission output shaft speed	≥ 89.0 RPM		
					set solenoid stuck on test trigger to TRUE when:			
					clutch pressure control solenoid stuck off stuck intrusive shift request	= FALSE		
					startle mitigation active (see startle mitigation active NOTE below)	= FALSE		
					clutch control solenoid test state	≠ TIE UP TEST TEST STATE		
					clutch control solenoid test state (see clutch control solenoid test state NOTE below)	≠ TIE UP TEST HOLD		
					initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10 C6 C45678910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state	= TEST WAITING		
					OR			
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C6 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable)	= 1 Boolean		
					OR			
					C6 off going clutch pressure	≤ 350.0 kPa	for C6 off going clutch pressure time ≥ **P2733 C6 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2733 C6 clutch exhaust delay time open throttle power on up shift OR **P2733 C6 clutch exhaust delay time garage shift** OR **P2733 C6 clutch exhaust delay time closed throttle down shift** OR **P2733 C6 clutch exhaust delay time negative torque up shift** OR **P2733 C6 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 655.0 kPa ≥ 655.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 655.0 kPa ≥ 655.0 kPa ≥ 655.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					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	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			available: engine speed enable C6 clutch slip speed fail compare when: diagnostic clutch test C6 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C6 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10 C6 C45678910R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C6 clutch pressured map 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 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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C6 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	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 Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On	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 not power down shift, C6 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 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 Illum.
		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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789, or, GR10 C6 C45678910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C6 off going clutch pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C6 off going clutch pressure time ≥ **P2733 C6 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2733 C6 clutch exhaust delay time open throttle power on up shift OR **P2733 C6 clutch exhaust delay time garage shift** OR **P2733 C6 clutch exhaust delay time closed throttle down shift** OR **P2733 C6 clutch exhaust delay time negative torque up shift** OR **P2733 C6 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 655.0 kPa ≥ 655.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation 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	 ≥ 655.0 kPa ≥ 655.0 kPa ≥ 655.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line pressure or GR10 C1 C123456R clutch) 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 Illum.
			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 Illum.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC pressure or GR10 C2 C128910R clutch) 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 Illum.
			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 Illum.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10 C3 C23457910 clutch) 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 Illum.
			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 Illum.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5 C1356789 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 Illum.
			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 Illum.
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 C23467810R clutch) 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 Illum.
			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 Illum.
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) 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 Illum.
			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 Illum.
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 pressure) 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 Illum.
			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 Illum.
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) 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 Illum.
			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 Illum.
Transmission Range Sensor A/B Correlation	P2805	Internal range sensor A is wired independently to the TCM while internal range sensor B is wired independently to the ECM. The monitor diagnoses the internal range sensor A PWM duty cycle by comparing the raw sensor A value against the raw sensor B adjusted value, to verify signals are consistent, or determine the TCM internal range sensor A does not correlate to the ECM internal range sensor B. The ECM transmits internal range sensor B raw PWM to the TCM over the serial data bus.	ABS((TCM internal range sesnor A + ECM internal range sesnor B raw adjusted for high or low time) - 100 %)) Increment fail and sample time, update rate 25 milliseconds	> 5.200 % duty cycle	diagnostic monitor enable P0707 fault active P0708 fault active U0100 fault active ECM internal range sesnor B available from ECM ECM internal range sesnor B fault active battery voltage ABS(TCM internal range sesnor A current loop value - TCM internal range sesnor A previous loop value), update TCM internal range sesnor A stablity time, update rate 25 milliseconds ABS(ECM internal range sesnor B current loop value - ECM internal range sesnor B previous loop value), update ECM internal range sesnor B stablity time, update rate 25 milliseconds TCM internal range sesnor A stability time met OR ECM internal range sesnor B stability time met ECM internal range sesnor B raw adjusted for	= 1 Boolean = FALSE = FALSE = FALSE = TRUE = FALSE ≥ 9.00 volts < 1.001 % duty cycle < 1.001 % duty cycle = ABS(ECM internal range sesnor B raw -	PWM fail time ≥ 2.000 seconds out of sample time ≥ 2.500 seconds battery voltage time ≥ 1.000 seconds TCM internal range sesnor A stability time ≥ 1.000 seconds ECM internal range sesnor B stability time ≥ 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					high or low time	0.000 %)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit or 10 speed Line Pressure 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit or 10 speed Line Pressure 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit or 10 speed Line Pressure 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Performance /Stuck Off	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 comand 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) ≥ **P2817 TCC 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 ≥ 400.0 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 Illum.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					accelerator pedal position	≥ 8.0 %		
					accelerator pedal position	≤ 100.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		
					engine torque	≥ 50.0 Nm		
					engine torque	≤ 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TCC control mode OR	= ON mode (controlled slip mode)		
					TCC control mode)	= LOCK		
					break latch state (clutch select valve solenoid)	= disabled (clutch select valve not transitioning)		
					attained gear	≥ CeCGSR_e_CR_Third		
					attained gear slip	≤ 25 RPM		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Stuck On - GF9 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve solenoid stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve solenoid is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	while control valve test time timing down: rate of change of torque convert slip speed = (ABS (current loop value torque convert slip speed - previous loop value torque convert slip speed) / 25 milliseconds) when clutch select valve soleniod multiplexed to TCC hydraulic AND torque convert slip speed = ABS(engine speed - transmission input shaft speed) AND torque convert slip speed = engine speed - transmission input shaft speed torque convert slip speed torque convert slip speed THEN increment fail time 25 millisecond update rate	≥ **P2818 torque convert derivative slip speed fail threshold** see supporting table ≤ **P0741 (GF9 specific) TCC slip speed crash RPM** ≥ -50.0 RPM ≤ 30.0 RPM	diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed service fast learn active battery voltage run crank voltage P281B falut active P281D falut active P281E falut active PRNDL PRNDL transmission fluid temperature transmission fluid	= 1 Boolean = 1 Boolean = 1 Boolean ≥ 400.0 RPM = FALSE ≥ 9.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE ≠ NEUTRAL ≠ REVERSE ≥ -6.66 °C ≤ 130.00 °C	fail time ≥ 1.500 seconds increment fail count fail count ≥ 4 counts 25 millisecond update rate engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supportinf table 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 Illum.
					temperature			
					accelerator pedal position	≥ 0.00 %		
					accelerator pedal position	≤ 1.00 %		
					vehicle speed	≥ 3.0 KPH		
					vehicle speed	≤ 9.5 KPH		
					TCC command mode	= OFF		
					break latch state (clutch select valve solenoid)	≠ disabled (clutch select valve transitioning)		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					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		
					(misfire requests TCC off OR	= FALSE		
					misfire TCC off 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777 fault pending P0796 fault pending P0797 fault pending P2714 fault pending P2715 fault pending P2723 fault pending P2724 fault pending P2732 fault pending P2733 fault pending P2820 fault pending P2821 fault pending vehicle speed accelerator pedal position hysteresis when: break latch state (clutch select valve solenoid) previous break latch state (clutch select valve solenoid) set stuck on test time and begin time down, 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	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≤ 8.0 KPH ≥ 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit/Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit or 10 speed TCC 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit or 10 speed TCC Control 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit or 10 speed TCC 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid J Stuck Off	P2820	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure 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 as hydraulic fluid is routed to the clutch C6 - C6789, or, 6th gear transmission gear ratio, based on transmission lever node design, the	gear ratio gear ratio OR C6 clutch slip speed, update fail time 6.25 milliscond update	≤ 1.700 ≥ 1.200 ≤ 20.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE 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 Illum.
		transmission input shaft speed, the transmission output shaft speed, and one transmission intermediate shaft speed, while not commanding 6th-9th gear, as the indication of the failure mode. This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.			available: engine speed diagnostic monitor enabled transmission output shaft speed transmission fluid temperature transmission fluid temperature P2820 test fail this key on (command gear OR attained gear) DTCs not fault pending DTCs not test fail this key on DTCs not fault active	≥ 400.0 RPM = 1 Booelan ≥ 35 RPM ≥ -256.00 °C ≤ 130.0 °C = FALSE = 1st lock = 1st lock P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Stuck On	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) 3.00 seconds OR C4 (C4) 3.00 seconds OR C5 (C57R) 3.00 seconds update Cx fail count, Cx fail count ≥ C3 (CB38) 3 counts OR C4 (C4) 3 counts OR C5 (C57R) 3 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 6.25 milliscond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			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: engine speed	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			diagnostic monitor enable 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 4 clutches: C3 (CB38) OR C4 (C4) OR C5 (C57R) enable Cx clutch slip speed fail compare when: diagnostic clutch test Cx ((startle mitigation active	= 1 Boolean = FALSE = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed = TRUE ≠ range shift completed = HOLDING CLUTCH = FALSE	table 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 Illum.
		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.			OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable FASLE (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	= TRUE ≠ 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 Illum.
					active set to TRUE when: 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	≠ REVERSE = NEUTRAL TEST = complete = TRUE = FALSE = CeCGSR_e_Fifth = CeCGSR_e_Fifth = CeCGSR_e_Third		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit or 10 speed PISA Valve Control 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit or 10 speed PISA 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Stall Prevention Active Signal Message Counter Incorrect	P30BD	The diagnostic monitor detects an alive rolling count error in the CAN frame containing the engine stall protection signal value.	rolling count value received from ECM and expected TCM calculated value not equal 50 millisecond update rate	= TRUE	10 millisecond update rate of enable conditions service mode $04 active battery voltage battery voltage time engine stall protection ECM frame recieved	 = FALSE ≥ 11.00 volts ≥ 300.000 seconds = TRUE	alive rolling count errors ≥ 10 out of 10 sample counts 50 millisecond update rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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 Illum.
Lost Communication With ECM	U0100	This DTC monitors for a loss of communication with the engine control module	Message is not received from controller for Message $0BE Message $0C9 Message $18E Message $1A1 Message $1A3 Message $1AA Message $1BA Message $287 Message $3D1 Message $3E9 Message $4C1 Message $4C7 Message $4D1 Message $4F1 Message $589	 ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 0.50 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 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 Illum.
					Network Management is not active for U0100 ECM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

2D Supporting Tables T76

Table 1

Axis	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00	N*m
Curve	100.00	120.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	RPM

Table 2

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.00	2.00	Sec

Table 3

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	3.50	3.50	Sec

Table 4

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.99	2.00	Sec

Table 5

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	3.00	3.00	Sec

Table 6

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.60	1.60	1.40	1.40	Sec

Table 7

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.40	1.40	1.30	1.20	Sec

2D Supporting Tables T76

Table 8

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.60	1.60	1.50	1.40	Sec

Table 9

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.30	1.30	1.20	1.10	Sec

Table 10

Axis	-30.00	-20.00	0.00	30.00	60.00	ºC
Curve	8.85	3.75	1.31	0.28	0.28	Sec

Table 11

Axis	-30.00	-20.00	0.00	30.00	60.00	ºC
Curve	5.00	1.70	0.40	0.25	0.25	Sec

Table 12

Axis	-30.00	-20.00	0.00	30.00	60.00	ºC
Curve	8.00	2.20	0.70	0.25	0.25	Sec

Table 13

Axis	-30.00	-20.00	0.00	30.00	60.00	ºC
Curve	5.20	1.60	0.50	0.27	0.23	Sec

Table 14

Axis	-30.00	-20.00	0.00	30.00	60.00	ºC
Curve	5.00	1.50	0.70	0.25	0.25	Sec

2D Supporting Tables T76

Table 15

Axis	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	ºC
Curve	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sec

Table 16

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.50	2.50	Sec

Table 17

Axis	-6.67	-6.66	40.00	ºC
Curve	0.40	0.35	0.30	Sec

Table 18

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	50.00	45.00	40.00	34.00	25.00	20.00	20.00	256.00	ºC

Table 19

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	50.00	45.00	40.00	34.00	25.00	20.00	20.00	256.00	ºC

Table 20

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	10.00	8.00	8.00	8.00	8.00	8.00	8.00	256.00	ºC

Table 21

Axis	-40.00	-20.00	40.00	ºC
Curve	5.00	3.00	1.00	Sec

2D Supporting Tables T76

Table 22

Axis	-6.67	-6.66	40.00	ºC
Curve	8191.75	8191.75	8191.75	RPM/Sec

Table 23

Axis	-6.67	-6.66	40.00	ºC
Curve	8191.75	8191.75	8191.75	RPM/Sec

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

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	0.100

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	0.100

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	0.100

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - 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
1	2	3	2	2	2	2	2

NumClchTieUp - 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
1	2	2	1	1	1	1	1

NumClchTieUp - Part 3

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

NumClchTieUp - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	1	1	3	2	2	2	2

NumClchTieUp - 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
1	2	2	2	1	1	1	1

NumClchTieUp - 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_wNC2C3C4C5
1	1	1	1	1	1	1	1

NumClchTieUp - 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
1	1	1	2	1	1	1	1

NumClchTieUp - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	0	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	1	0	0	0

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

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

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

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

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time closed throttle lift foot up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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	2.000	1.100	0.813	0.500	0.269

Initial Supporting table - P0777 C2 clutch exhaust delay time 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	0.350	0.200

Initial Supporting table - P0777 C2 clutch exhaust delay time closed throttle lift foot up shift

Description: P0777 C2 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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	0.900	0.800	0.700	0.262

Initial Supporting table - P0797 C3 clutch exhaust delay time closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.300	1.000	0.950	0.469	0.200

Initial Supporting table - P0797 C3 clutch exhaust delay time closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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	0.800	0.750	0.650	0.256

Initial Supporting table - P0797 C3clutch exhaust delay time 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 - 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	0	1
1	25	25

Initial Supporting table - P2715 C4 clutch exhaust delay time 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	0.750	0.700	0.663	0.225

Initial Supporting table - P2715 C4 clutch exhaust delay time closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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	0.650	0.600	0.550	0.300

Initial Supporting table - P2724 C5 clutch exhaust delay time closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.700	1.369	1.100	0.650	0.337

Initial Supporting table - P2724 C5 clutch exhaust delay time closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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	2.900	1.350	1.100	0.850	0.406

Initial Supporting table - P2733 C6 clutch exhaust delay time closed throttle down shift

Description: P2733 C6 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	1.100	0.719	0.400	0.350

Initial Supporting table - P2733 C6 clutch exhaust delay time 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 - P2733 C6 clutch exhaust delay time 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 - P2733 C6 clutch exhaust delay time 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 - P2733 C6 clutch exhaust delay time 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 - P2733 C6 clutch exhaust delay time 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	0.600	0.600

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	131.3	131.3	9,999.0	344.3	409.6

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	131.3	344.3	131.3	9,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	344.3	50.0	50.0	409.6

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	644.8	644.8	50.0	131.3	9,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	344.3	409.6	9,999.0	131.3	344.3

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	131.3	9,999.0	50.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	344.3	50.0	50.0	409.6	644.8

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	644.8	50.0	131.3	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	644.8	409.6	344.3	50.0
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	359	359	359	9,999	2,125
P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	801	489	359	512	9,999
P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	801	489	50	50
P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,125
P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	765	765	50	359	359
P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,125	801	489	359
P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	512	9,999	50	50	50
P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,125	765
P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	765	50	512	570	570
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	801	489
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	359	765	2,125	9,999	50
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	245	245	247	1,293	9,999
P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	706	245	247	245	1,295
P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	706	360	50	50
P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,293	50	50	9,999
P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	674	674	50	245	247
P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,293	9,999	706	245	247
P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	245	1,295	50	50	50
P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,293	50	50	9,999	674
P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	674	50	245	273	273
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	706	360
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	247	674	9,999	1,293	50
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	433	433	482	1,041	1,585
P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	433	915	433	1,145
P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,713	9,999	1,772	50	50
P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,041	50	50	1,585
P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	433	482
P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,041	1,585	9,999	433	915
P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	433	1,145	50	50	50
P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,041	50	50	1,585	9,999
P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	433	482	482
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,145	1,145	1,713	9,999	1,772
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	915	2,030	1,585	1,041	50
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	140	140	140	255	318

P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	646	9,999	685	140	255

P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	318	646	9,999	50	50

P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	781	50	50	1,188

P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	140	140

P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	255	318	646	9,999	685

P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	140	255	50	50	50

P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	781	50	50	1,188	9,999

P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	140	140
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	255	255	318	646	9,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	685	9,999	1,188	781	50
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	178	178	178	283	330

P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	504	253	9,999	178	283

P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	330	504	1,036	50	50

P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999

P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	178	178

P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	283	330	504	253	9,999

P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	178	283	50	50	50

P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50

P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	253	178	178
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	283	283	330	504	1,036
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50

P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50

P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: ime 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	0.100

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	0.100

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - 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
1	2	3	2	2	2	2	2

NumClchTieUp - 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
1	2	2	1	1	1	1	1

NumClchTieUp - Part 3

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

NumClchTieUp - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	1	1	3	2	2	2	2

NumClchTieUp - 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
1	2	2	2	1	1	1	1

NumClchTieUp - 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_wNC2C3C4C5
1	1	1	1	1	1	1	1

NumClchTieUp - 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
1	1	1	2	1	1	1	1

NumClchTieUp - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

Initial Supporting table - P0741 (GF9 specific) TCC slip speed crash RPM

Description: RPM limit used to establish slip crashed when TCC oil became available

Value Units: RPM
X Unit: % accelerator position

y/x	0.00	15.00	25.00	50.00	75.00
1	100	100	160	233	300

Initial Supporting table - P0741 (GF9 specific) torque convert derivative slip speed fail threshold

Description: he fail threshold, rate of change of torque converter slip speed, at which the torque convert clutch is considered stuck on.

Value Units: RPM/second
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
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 - P0741 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 - 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	0	1
1	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 - P2818 torque convert derivative slip speed fail threshold

Description: The fail threshold, rate of change of torque converter slip speed, at which the torque convert clutch is considered stuck on.

Value Units: RPM/second
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
0	-600.0	-600.0	-600.0
15	-600.0	-600.0	-600.0
25	-900.0	-900.0	-900.0
50	-1,200.0	-1,200.0	-1,200.0
75	-1,500.0	-1,500.0	-1,500.0

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	131.3	131.3	9,999.0	344.3	409.6

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	131.3	344.3	131.3	9,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	344.3	50.0	50.0	409.6

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	644.8	644.8	50.0	131.3	9,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	344.3	409.6	9,999.0	131.3	344.3

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	131.3	9,999.0	50.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	344.3	50.0	50.0	409.6	644.8

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	644.8	50.0	131.3	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	644.8	409.6	344.3	50.0
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	359	359	359	9,999	2,125
P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	801	489	359	512	9,999
P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	801	489	50	50
P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,125
P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	765	765	50	359	359
P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,125	801	489	359
P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	512	9,999	50	50	50
P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,125	765
P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	765	50	512	570	570
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	801	489
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	359	765	2,125	9,999	50
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	245	245	247	1,293	9,999
P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	706	245	247	245	1,295
P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	706	360	50	50
P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,293	50	50	9,999
P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	674	674	50	245	247
P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,293	9,999	706	245	247
P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	245	1,295	50	50	50
P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,293	50	50	9,999	674
P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	674	50	245	273	273
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	706	360
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	247	674	9,999	1,293	50
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	433	433	482	1,041	1,585
P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	433	915	433	1,145
P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,713	9,999	1,772	50	50
P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,041	50	50	1,585
P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	433	482
P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,041	1,585	9,999	433	915
P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	433	1,145	50	50	50
P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,041	50	50	1,585	9,999
P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	433	482	482
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,145	1,145	1,713	9,999	1,772
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	915	2,030	1,585	1,041	50
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	140	140	140	255	318

P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	646	9,999	685	140	255

P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	318	646	9,999	50	50

P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	781	50	50	1,188

P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	140	140

P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	255	318	646	9,999	685

P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	140	255	50	50	50

P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	781	50	50	1,188	9,999

P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	140	140
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	255	255	318	646	9,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	685	9,999	1,188	781	50
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	178	178	178	283	330

P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	504	253	9,999	178	283

P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	330	504	1,036	50	50

P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999

P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	178	178

P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	283	330	504	253	9,999

P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	178	283	50	50	50

P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50

P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	253	178	178
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	283	283	330	504	1,036
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50

P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50

P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch Diagnostics								
Transmission Range Selector Switch "A" Circuit High	P17E3	Transmission Range Selector Switch "A" Diagnostic detects a reading High	Transmission Range Selector Switch "A" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "A" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "A" Circuit Low	P17E4	Transmission Range Selector Switch "A" Diagnostic detects a reading Low	Transmission Range Selector Switch "A" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "A" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "A" Circuit Performance	P17E5	Transmission Range Selector Switch "A" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "A" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P17E3 OR P17E4	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "A" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "B" Circuit High	P17E6	Transmission Range Selector Switch "B" Diagnostic detects a reading High	Transmission Range Selector Switch "B" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "B" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "B" Circuit Low	P17E7	Transmission Range Selector Switch "B" Diagnostic detects a reading Low	Transmission Range Selector Switch "B" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "B" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "B" Circuit Performance	P17E8	Transmission Range Selector Switch "B" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEBSED zones.	Transmission Range Selector Switch "B" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P17E6 OR P17E7	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "B" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "C" Circuit High	P17E9	Transmission Range Selector Switch "C" Diagnostic detects a reading High	Transmission Range Selector Switch "C" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "C" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "C" Circuit Low	P17EA	Transmission Range Selector Switch "C" Diagnostic detects a reading Low	Transmission Range Selector Switch "C" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "C" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "C" Circuit Performance	P17EB	Transmission Range Selector Switch "C" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "C" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P17E9 OR P17EA	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "C" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "D" Circuit High	P17EC	Transmission Range Selector Switch "D" Diagnostic detects a reading High	Transmission Range Selector Switch "D" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "D" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "D" Circuit Low	P17ED	Transmission Range Selector Switch "D" Diagnostic detects a reading Low	Transmission Range Selector Switch "D" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "D" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "D" Circuit Performance	P17EE	Transmission Range Selector Switch "D" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "D" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P17EC OR P17ED	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "D" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "E" Circuit High	P17EF	Transmission Range Selector Switch "E" Diagnostic detects a reading High	Transmission Range Selector Switch "E" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "E" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "E" Circuit Low	P17F0	Transmission Range Selector Switch "E" Diagnostic detects a reading Low	Transmission Range Selector Switch "E" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "E" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "E" Circuit Performance	P17F8	Transmission Range Selector Switch "E" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "E" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P17EF OR P17F0	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "E" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "F" Circuit High	P17F9	Transmission Range Selector Switch "F" Diagnostic detects a reading High	Transmission Range Selector Switch "F" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "F" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "F" Circuit Low	P17FD	Transmission Range Selector Switch "F" Diagnostic detects a reading Low	Transmission Range Selector Switch "F" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "F" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "F" Circuit Performance	P17FE	Transmission Range Selector Switch "F" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "F" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P17F9 OR P17FD	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "F" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "G" Circuit High	P1803	Transmission Range Selector Switch "G" Diagnostic detects a reading High	Transmission Range Selector Switch "G" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "G" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "G" Circuit Low	P1805	Transmission Range Selector Switch "G" Diagnostic detects a reading Low	Transmission Range Selector Switch "G" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "G" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "G" Circuit Performance	P1806	Transmission Range Selector Switch "G" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "G" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P1803 OR P1805	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "G" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "H" Circuit High	P1807	Transmission Range Selector Switch "H" Diagnostic detects a reading High	Transmission Range Selector Switch "H" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "H" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "H" Circuit Low	P180C	Transmission Range Selector Switch "H" Diagnostic detects a reading Low	Transmission Range Selector Switch "H" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "H" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "H" Circuit Performance	P180D	Transmission Range Selector Switch "H" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "H" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P1807 OR P180C	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "H" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "J" Circuit High	P180E	Transmission Range Selector Switch "J" Diagnostic detects a reading High	Transmission Range Selector Switch "J" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "J" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "J" Circuit Low	P180F	Transmission Range Selector Switch "J" Diagnostic detects a reading Low	Transmission Range Selector Switch "J" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "J" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "J" Circuit Performance	P1812	Transmission Range Selector Switch "J" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "J" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P180E OR P180F	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "J" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "L" Circuit High	P186B	Transmission Range Selector Switch "L" Diagnostic detects a reading High	Transmission Range Selector Switch "L" Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "L" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "L" Circuit Low	P186C	Transmission Range Selector Switch "L" Diagnostic detects a reading Low	Transmission Range Selector Switch "L" Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "L" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "L" Circuit Performance	P186D	Transmission Range Selector Switch "L" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "L" Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P186B OR P186C	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "L" Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Park Button Diagnostics								
Transmission Park Position Sensor/Switch A Circuit High	P07B4	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 83.4% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 43.6% (of 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
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.	Park Position Measured Voltage	53.2%<X<73.7% (of 5 Volts)	DTC not set	P07B3 OR P07B4	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch B Circuit High	P07BA	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 83.4% (of 5 Volts)	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Park Position Sensor/Switch B Circuit Low	P07B9	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 43.6% (of 5 Volts)	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch B Circuit Performance	P07BB	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	53.2%<X<73.7% (of 5 Volts)	Diagnostic Enable Calibration DTC not set	=TRUE P07BA P07B9	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
SIB Controller Fault Diagnostics								

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Control Module Memory Checksum Error	P17D8	This DTC will be stored if any software or calibration check sum is incorrect. Modeled after GMs DTC P0601	Calculated Checksum	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR Accessory	Run or Run/Crank ON	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
		Circuit Monitor mismatch occurs	Switch circuit calculated values	≠ switch circuit monitor values	Ignition OR Accessory	Run or Run/Crank ON	Test runs during calculation of switch circuit values	
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the Built in self test for ROM checksum or the ROM Error correcting code (ECC) check fails.	Checksum at power-up	≠ checksum at power-down	Ignition OR Accessory	Run or Run/Crank ON	1 failure Frequency: Once at power-up	DTC Type A 1 trip
			ROM ECC	= fault	Ignition OR Accessory	Run or Run/Crank ON	1 failure Frequency: Runs continuously in the background	
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. Modeled after GMs DTC	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 Frequency: Runs continuously in the background	DTC Type A 1 trip

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
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. Modeled after GMs DTC P0606			Ignition Accessory	Run or Run/Crank OR ON		DTC Type A 1 trip
		1. Microprocessor ALU Integrity Diagnostic Monitor Algorithm	Calculated key from rolling seed	≠ expected key			1 failure Test runs continuously (20ms loop or less)	
		2. Main Processor Configuration Register Test	Processor register	≠ expected processor register value			1 failure Test runs continuously (20ms loop or less)	
		3: Seed and Key fault (Set by ECM when seeds and keys do not match)					1 failure Test runs continuously (25ms loop or less)	
		4. Stack overflow	Unused stack memory above maximum stack used	≠ initialized special pattern			1 failure Test run by OS on task switches	
		5. Program Counter exception error	Illegal instruction loaded into program counter				1 failure	
		6. Watchdog Fails to reset	If a fault that should cause a reset fails to cause a reset.				1 failure	

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Power Moding Diagnostics								
Transmission Range Selector Control Module System Voltage Low	P17DD	Sets when the low voltage system voltage is below a threshold	Battery Voltage	<= 10 Volts	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	5 seconds in a 6 second window	Type C
Transmission Range Selector Control Module System Voltage Performance	P17DF	Sets when voltage system voltage signal is erratic.	Battery Voltage Measured Delta Over 10 ms	> 3 Volts	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	16 failures out of 40 Samples (SIB is 5 msec loop)	Type C
Transmission Range Selector Control Module System Voltage High	P17DE	Sets when the low voltage system voltage is above a threshold	Battery Voltage	> 16 Volts	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	5 seconds in a 6 second window	Type C
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

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
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	4.5 sec in 5.5 second window	Type B 2 trips
Transmission Range Selector Control Module Ignition Accessory Circuit Low	P17E2	Detects if the Accessory Position circuit is shorted to low or open	Accessory voltage	<= 6 V	-	-	4.5 sec in 5.5 second window	DTC Type C
Communication Diagnostics								
Transmission Range Selection Signal Message Counter Incorrect	P17D7	ARC & PV reported SIB for $1E8 signal from the ECM on Powertrain Sensor CAN Bus	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Ignition	Run or Run/Crank	1 second	DTC Type B 2 trips
Transmission Range Selector Control Module Powertrain Sensor CAN Bus Off	U240E	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Sensor Bus Status	Off	Ignition	Run or Run/Crank	1 second	DTC Type B 2 trips

Diagnostic Name	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Control Module Powertrain Expansion CAN Bus Off	U240D	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Expansion Bus Status	Off	Ignition	Run or Run/Crank	1 second	DTC Type B 2 trips
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 2. Ignition Run/Crank Voltage	Run or Run/Crank 11V<RCVolt <32V	1 second	DTC Type B 2 trips
LED Diagnostics								
Shifter Interface Board Range Indicator Failed OR Remote PRNDL Display Internal Electronic Failure	B071F	Detects an indicator LED circuit with a latent fault where an indicator LED could light with a single fault	When sequencing transitors Circuit Feedback Current	> 520 uA (worst case)	Ignition	Run or Run/Crank	detected within 50 ms at first key up	DTC Type C

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module Read Only Memory (ROM)	P17AA	This DTC will be stored if any software or calibration check sum is incorrect.	Calculated Checksum	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration) Note: ROM start & end are calibratable.	Hardwire Powermode	= Run/Crank OR =Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Runs continuously in the background and takes 300 ms to complete ROM check	DTC Type A One Trip
Transmission Range Control Module Not Programmed	P17AB	Indicates that the ECU needs to be programmed	No Start Calibration Or Calibration	= TRUE ≠ VALID	Hardwire Powermode	= Run/Crank OR =Accessory	Runs at power up And continously	DTC Type A One Trip
Transmission Range Control Module Long Term Memory Reset	P17AC	Non-volatile memory checksum error at controller power-up.	Checksum at power-up	≠ checksum at power-down	Hardwire Powermode	= Run/Crank OR =Accessory	1 failure Frequency: Once at power-up	DTC Type A One Trip
Transmission Range Control Module Random Access Memory (RAM)	P17AD	Indicates that control module is unable to correctly write and read data to and from RAM.	Data read OR ECC	≠ Data written Has ERROR	Hardwire Powermode	= Run/Crank OR =Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Runs continuously in the background and takes 500 ms to complete RAM block check	DTC Type A One Trip
Transmission Range Control Module Internal Performance	P17AE	Indicates the ECU has detected an internal processor fault or external watchdog fault			Hardwire Powermode	= Run/Crank OR =Accessory		DTC Type A One Trip
		Micro data update check Micro data sequence check	Rolling Count OR Maximum Flow Count	=ERROR OR =ERROR			Error set A=10 times	
		Main Processor Configuration Register Test	I/O configuration register faults	=Incorrect value			3 failures during run crank cycle	
		Processor clock test	Processor Clock	=Faulted			1 failure Runs continuously	
		External watchdog test	External Watchdog	=Faulted			1 failure during power up	
		Internal watchdog test	Internal Watchdog	=Faulted			57 failures out of 71 samples	
		PWM pin status during power up	PWM pin status at power up	=INCORRECT VALUE (1)			1 failures during power up	
		Microcontroller configuration register test and interrupt performance monitor test	Configuration register value Number of interrupt calls	=INCORRECT VALUE =INCORRECT VALUE			5 out failures out of 5 samples for register test and 10 out of 10 for interrupt performance	
		ALU test	ALU result	=INCORRECT VALUE			3 failures during run crank cycle	
		Memory stack over flow	Memory stack usage	>75% stack memory			3 failures during run crank cycle	
		ADC internal error	ADC internal reference ADC external reference does not run below 6Volts	=INCORRECT VALUE =INCORRECT VALUE			3 failures during run crank cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module System Voltage Low	P17B0	Sets when the battery system voltage is below a threshold	Battery Voltage	<= 9 Volts	U18AA AND CAN message OR Hardwire Powermode OR PT Crank Active	=Not Faulted =RUN/CRANK =Accessory =false (min time & max time enabled)	5 seconds in a 6 second window	DTC Type C No MIL
Transmission Range Control Module System Voltage Performance	P17B1	Sets when battery system voltage signal is erratic.	Battery Voltage Measured Delta Over 15ms	> 3 Volts	CAN message OR Hardwire Powermode PT Crank Active	=RUN/CRANK =Accessory =false (min time & max time enabled)	40 out of 50 counts 25ms sample	DTC Type C No MIL
Transmission Range Control Module System Voltage High	P17B2	Sets when the battery voltage is above a threshold	Battery Voltage	> 16 Volts	U18AA AND CAN message OR Hardwire Powermode PT Crank Active	=Not Faulted =RUN/CRANK =ACC =false (min time & max time enabled)	5 seconds in a 6 second window	DTC Type C No MIL
Transmission Range Control Module Ignition 1 Switch Circuit Low Voltage	P17B3	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 8 V	U18AA AND CAN message OR Hardwire Powermode PT Crank Active	=Not Faulted =RUN/CRANK =ACC =false (min time & max time enabled)	180 failures out of 200 samples 25ms sample	Type B Two Trips
Transmission Range Control Module Ignition 1 Switch Circuit High Voltage	P17B4	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	U18AA AND CAN message OR Hardwire Powermode PT Crank Active	=Not Faulted = NOT RUN/CRANK =Accessory =false (min time & max time enabled)	180 failures out of 200 samples 25ms sample	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module Ignition Switch Accessory Position Circuit Low	P17B5	Detects if the Accessory Position circuit is shorted to low or open	Accessory voltage	<= 6 V	U18AA AND CAN message OR Hardwire Powermode PT Crank Active	=Not Faulted =RUN/CRANK =ACC =false (min time & max time enabled)	180 failures out of 200 samples 25ms sample	DTC Type C No MIL
Transmission Range Control Module Sensor Reference A Circuit Low	P173A	This diagnostic monitors the buffered 5V supply circuit A	5V supply circuit measured percentage	X < 95%	Battery Voltage Hardwire Powermode	> 9 volts =Run/Crank OR =Accessory	4 seconds	DTC Type B Two Trips
		DTC Pass	5V supply circuit measured percentage	95% < X < 115%			1 second	
Transmission Range Control Module Sensor Reference A Circuit High	P173B	This diagnostic monitors the buffered 5V supply circuit A	5V supply circuit measured percentage	X > 115%	Battery Voltage Hardwire Powermode	> 9 volts =Run/Crank OR =Accessory	4 seconds	DTC Type B Two Trips
		DTC Pass	5V supply circuit measured percentage	95% < X < 115%			1 second	
Transmission Range Control Module Sensor Reference A Circuit Intermittent/Erratic	P173C	For Safety: This diagnostic monitors the 5V Reference A Circuit for a noisy/erratic failure	5V Reference A Voltage Measured Delta Over 15ms	> 0.325 Volts	Battery Voltage Hardwire Powermode	> 9 volts =Run/Crank OR =Accessory	75 ms out of a 300 ms window	DTC Type B Two Trips
Transmission Range Control Module Sensor Reference B Circuit Low	P173D	This diagnostic monitors the buffered 5V supply circuit B	5V supply circuit measured percentage	X < 95%	Battery Voltage Hardwire Powermode	> 9 volts =Run/Crank OR =Accessory	4 seconds	DTC Type B Two Trips
		DTC Pass	5V supply circuit measured percentage	95% < X < 115%			1 second	
Transmission Range Control Module Sensor Reference B Circuit High	P173E	This diagnostic monitors the buffered 5V supply circuit B	5V supply circuit measured percentage	X > 115%	Battery Voltage Hardwire Powermode	> 9 volts =Run/Crank OR =Accessory	4 seconds	DTC Type B Two Trips
		DTC Pass	5V supply circuit measured percentage	95% < X < 115%			1 second	
Transmission Range Control Module Sensor Reference B Circuit Intermittent/Erratic	P173F	For Safety: This diagnostic monitors the 5V Reference B Circuit for a noisy/erratic failure	5V Reference B Voltage Measured Delta Over 15ms	> 0.325 Volts	Battery Voltage Hardwire Powermode	> 9 volts =Run/Crank OR =Accessory	75 ms out of a 300 ms window	DTC Type B Two Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module Rotary Shaft Postion Loss of Signal	P17B6	Sets when the TRCM detects the signal from the Rotary Shaft Position is Lost			Hardwire Powermode	= Run/Crank OR =Accessory	57 failures out of 71 samples 5 ms loop	DTC Type A One Trip
Transmission Range Control Module Rotary Shaft Postion Signal Low	P17B7	Sets when the TRCM detects the signal from the Rotary Shaft Position is Low.	Measured counts <	300 counts (6.6 deg)	Hardwire Powermode	= Run/Crank OR =Accessory	57 failures out of 71 samples 5 ms loop	DTC Type A One Trip
Transmission Range Control Module Rotary Shaft Postion Signal High	P17B8	Sets when the TRCM detects the signal from the Rotary Shaft Position is High.	Measured counts >	3500 count (76.9 deg)	Hardwire Powermode	= Run/Crank OR =Accessory	57 failures out of 71 samples 5 ms loop	DTC Type A One Trip
Transmission Range Control Module Rotary Shaft Postion Perfomance	P17B9	Set when the TRCM detects the diagnostic data from the Rotary Sensor indicates an internal failure.	Micro Fault	= ADC failure, ADC saturation, Analog Gain too Low, Magnetic Field too Weak, Magnetic Field too Strong, Analog Gain too High, Offset too High OR Device Vdd > 7V	Hardwire Powermode	= Run/Crank OR =Accessory	57 failures out of 71 samples 5 ms loop	DTC Type A One Trip
Transmission Range Control Module Motor Enable Circuit Low	P17BA	Transmission Range Control Module Motor Enable Circuit Low Diagnostic detects when the TRCM MOSFET enable circuit is low	Measured Voltage Percent (hardware fault)	<2 %	Hardwire Powermode MOSFET Status DTP Status (CE) U18A9 PT Crank Active	= Run/Crank OR =Accessory =On = Not Active =Not Faulted =false (min time & max time enabled)	60 Failures out of 60 Samples 5 ms loop	DTC Type A One Trip
Transmission Range Control Module Motor Enable Circuit High	P17BB	Transmission Range Control Module Motor Enable Circuit High Diagnostic detects when the TRCM MOSFET enable circuit is shorted	Measured Voltage	Less than 0.4 volts OR greater than 1.1 volts	Hardwire Powermode PT Crank Active	=Run or Crank OR =Accessory =false (min time & max time enabled)	60 Failures out of 60 Samples 5 ms loop	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module Range Motor Voltage Low	P17BC	Transmission Range Control Module Range Motor Voltage Low Diagnostic detects when any of the TRCM Motor Control MOSFETS are open	Measured Voltage Percent (spread sheet depending on on & off & overall voltage done in background)	<2 %	Hardwire Powermode MOSFET Status DTP Status (CE) U18A9 PT Crank Active	= Run/Crank OR =Accessory =On = Not Active =Not Faulted =false (min time & max time enabled)	60 Failures out of 60 Samples 5 ms loop	DTC Type A One Trip
Transmission Range Control Module Range Motor Voltage High	P17BD	Transmission Range Control Module Range Motor Voltage High Diagnostic detects when any of the TRCM Motor Control MOSFETS are shorted	Measured Voltage Percent (spread sheet depending on on & off & overall voltage done in background)	> 98%	Hardwire Powermode MOSFET Status DTP Status (CE) U18A9 PT Crank Active	= Run/Crank OR =Accessory =On = Not Active =Not Faulted =false (min time & max time enabled)	60 Failures out of 60 Samples 5 ms loop	DTC Type A One Trip
Transmission Range Select Motor Control Circuit Current Too High	P17BF	Detects when the TRCM Motor Control Circuit has high current	Uses comparitor	> hardware set value 34 amps	Hardwire Powermode	= Run/Crank OR =Accessory	Retry algorithm such that diagnostic sets with 6 failures within 400 msec OR sets if it does not reach the commanded range with 1 or more failures >= 400 msec	DTC Type A One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module High Speed CAN Bus Off	U2409	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	= Off	Hardwire Powermode	= Run/Crank OR =Accessory	1 second	DTC Type B Two Trips
TRCM Lost Communication With ECM on HS GMLAN CAN Bus	U18AA	Detects that CAN serial data communication has been lost with the ECM	Message $4C1, $0C9, $1DF, $4F1, Plus $1F7 on Gen2	Undetected	Hardwire Powermode	= Run/Crank OR =Accessory	25 failures out of 25 samples 40 ms loop (1 sec)	DTC Type B Two Trips
Lost Communication With CHCM on HS GMLAN CAN Bus	U18AB	Detects when the TRCM Loses Communication with CHCM on HS GMLAN Bus "A"	Message $1F7	Undetected	Hardwire Powermode	= Run/Crank OR =Accessory	1 second	DTC Type B Two Trips
Transmission Range Control Module Range Command Signal Message Counter Incorrect	P174B	ARC & PV report by TRCM about signal $1F7 from CHCM or ECM on GMLAN Bus "A"	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Hardwire Powermode	= Run/Crank OR =Accessory	4 seconds (160 messages)	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Lost Communication With CHCM on Chassis Expansion CAN Bus "B"	U18A9	Detects when the TRCM Loses Communication with the CHCM on the CE Bus "B"	Message $207	Undetected	Hardwire Powermode	= Run/Crank OR =Accessory	1 second	DTC Type B Two Trips
Lost Communication With EBCM on Chassis Expansion CAN Bus "B"	U18AD	Detects when the TRCM Loses Communication with the EBCM on the CE Bus "B"	Message $0C1, $500	Undetected	Hardwire Powermode	= Run/Crank OR =Accessory	1 second	DTC Type C No MIL
Transmission Range Control Module Wheel Speed Signal Message Counter Incorrect	P174C	Sets if wheel speed CAN data $0C1 is invalid or error on CAN sequence number data.	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR Validity	Current ARC ≠ Previous ARC +1 not Valid	Hardwire Powermode	= Run/Crank OR =Accessory	1.1 seconds (110 messages)	DTC Type C No MIL
TRCM ETRS General Status Signal Message Incorrect	P1771	GEN1: ARC & PV reported TRCM for $207 signal from the CHCM GEN2: ARC & PV reported TRCM for $1D7 signal frrom the ECM	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Hardwire Powermode	= Run/Crank OR =Accessory	4 seconds (160 messages)	DTC Type B Two Trips
Transmission Range Control Module Chassis Expansion CAN Bus Off	U240A	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	= Off	Hardwire Powermode	= Run/Crank OR =Accessory	1 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module Range Not Learned	P174D	If the values are not populated with values during the learn process, then this DTC is set			Hardwire Powermode	= Run/Crank OR =Accessory		DTC Type A One Trip
Transmission Range Control Module Range Motor Protection Mode Active	P17C8	Detects and reports fault when the motors are shut off for protection and the actual range is not achieved	Motors are shut off for motor/circuit protection.	This can happen in as short as 500 ms. Record commanded range at motor shut down	Not Fault Active	P17B6, P17B7, P17B8, P17B9	500 msec	DTC Type B One Trip
		DTC Pass	On a new command from CHCM and Range Commanded (range that it failed in) Motor Status	 =Actual Range Achieved ≠ Protection Shutdown				
Lost Communication With ECM on Powertrain Expansion Bus	U18CC	Detects when the TRCM Loses Communication with the ECM on the PT EXP Bus	Message $1D7	Undetected	Hardwire OR (Enable Cal AND Hardwire	=Run or Crank OR = ok to run in ACC =Accessory)	1 second	DTC Type B 2 trips
Lost Communication With EBCM on HS GMLAN	U240F	Detects when the TRCM Loses Communication with the EBCM on HS GMLAN	Message $0C1, $500	Undetected	Hardwire OR (Enable Cal AND Hardwire	=Run or Crank OR = ok to run in ACC =Accessory)	1 second	DTC Type C
Lost Communication With BCM on HS GMLAN	U2410	Detects when the TRCM Loses Communication with the BCM on HS GMLAN	Message $1F1	Undetected	Hardwire OR (Enable Cal AND Hardwire	=Run or Crank OR = ok to run in ACC =Accessory)	4 seconds	DTC Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
Transmission Range Control Module Powertrain Expansion Bus Off	U2411	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Hardwire OR (Enable Cal AND Hardwire	=Run or Crank OR = ok to run in ACC =Accessory)	1 second	DTC Type B 2 trips

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant Control Module Sensor Reference Voltage 1 Low Voltage	P1018	Reductant control module sensor 12V supply low voltage condition	Test 1: VCC_PLAUS_VB_L		Sensor supply commanded on	= true	1200 ms	Type A
			Battery voltage - sensor supply voltage	> 4V				
					Sensor Bus wake up	=true		
					Battery voltage	>= 9V		
					Timer to inhibit the diagnosis	=0 (countdown from 2s)		
Reductant Control Module Sensor Reference Voltage 1 High Voltage	P1019	Reductant control module sensor 12V supply high voltage condition	Test 1: VCC_PLAUS_VB_H		Sensor supply commanded on	= true	1200 ms	Type A
			Sensor supply voltage - battery voltage	> 4V				
					Sensor Bus wake up	=true		
					Battery voltage	>= 9V		
					Timer to inhibit the diagnosis	=0 (countdown from 2s)		
Reductant Pump Driver High Temperature	P103F	The reductant control module detects if the DEF pump driver stage temperature is too high	Test 1: EM_RAG_OVER_TEMP_DR_SCR		Battery voltage - filtered value	> 0 V	1000 ms	Type A
					Basic enable conditions met for FID_ERR_EM_RAG_OVER_TEMP_DR_SCR	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
			Power stage temperature from DEF temperature sensor 2	< 140 °C	No pending or confirmed DTC's for FID_ERR_EM_RAG_OVER_TEMP_DR_SCR	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Pump Low Speed	P105A	The reductant control module checks if the reductant pump motor speed is too low (pump is stuck), when being commanded to turn.	Test 1: EM_RAG_STALL		Battery voltage - filtered value	> 0 V	1.55 s	Type A
			(Absolute value of urea supply pump motor speed	< 60 rpm				
			AND Flag (LV_STATE_DIS_MOD_REV_CMPL) to indicate one rotation during discrete control mode - see SummTable Bit-Definitions	= false				
			AND Flag (lv_act_dis_mod) to indicate active discrete mode) - see SummTable Bit-Definitions	= true	Basic enable conditions met for FID_ERR_EM_RAG_STALL	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
			OR (Absolute value of urea supply pump motor speed	< 60 rpm				
			AND		No pending or confirmed DTC's for FID_ERR_EM_RAG_STALL	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
			Setpoint for speed controller	>= 270 rpm				
			AND Timer for maximum duration of the stall state of electric motor	> 0,3 sec				
			Time required to restart electric motor)	>= 0,05 sec				
			for number of events	>= 5				
			AND Counter for the attempts to unblock to rotor	> 20				
			Timer for maximum duration of the stall state of electric motor	>= 0,3 sec				
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	This diagnostic checks if the General Diagnostic Status S1 message's current alive rolling count does not equal the previous alive rolling count, incremented by 1. It also checks if the signal's calculated checksum does not equal the transmitted checksum.	Test 1: COM_SCAN_GENERAL_DIAGNOSTIC_TCC		Sensor bus on	=true	250 ms	Type A
			Wrong Alive Rolling Count received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					AND Delay counter for activating CAN diagnosis	>= 1 sec		
			Test 2: COM_SCAN_GENERAL_DIAGNOSTIC_CRC		Sensor bus on	=true	250 ms	
			Wrong checksum received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					AND Delay counter for activating CAN diagnosis	>= 1 sec		
Reductant Control System Signals Message Counter Incorrect	P10C7	This diagnostic checks if the DEFC Information 3 and DEFC Information 4 message's current alive rolling counts do not equal the previous alive rolling counts, incremented by 1. It also checks if the signal's calculated checksums do not equal the transmitted checksums	Test 1: COM_SCAN_DEFC_INFORMATION_3_TCC		Sensor bus on	=true	1000 ms	Type A
			Wrong Alive Rolling Count received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					AND Delay counter for activating CAN diagnosis	>= 1 sec		
			Test 2: COM_SCAN_DEFC_INFORMATION_3_CRC		Sensor bus on	=true	1000 ms	
			Wrong checksum received	= true	AND			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS AND Delay counter for activating CAN diagnosis	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 sec		
			Test 3: COM_SCAN_DEFC_INFORMATION_4_TCC		Sensor bus on	=true	2500 ms	
			Wrong Alive Rolling Count received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS AND Delay counter for activating CAN diagnosis	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 sec		
			Test 4: COM_SCAN_DEFC_INFORMATION_4_CRC		Sensor bus on	=true	2500 ms	
			Wrong checksum received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS AND Delay counter for activating CAN diagnosis	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 sec		
Reductant Temperature Signals Message Counter Incorrect	P10C8	This diagnostic checks if the DEFC Service Device Controls message's current alive rolling count does not equal the previous alive rolling count, incremented by 1. It also checks if the signal's calculated checksum does not equal the transmitted checksum.	Test 1: COM_SCAN_DEFC_SERVICE_DEVICE_TCC		Sensor bus on	=true	1000 ms	Type B
			Wrong Alive Rolling Count received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS AND Delay counter for activating CAN diagnosis	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 sec		
			Test 2: COM_SCAN_DEFC_SERVICE_DEVICE_CRC		Sensor bus on	=true	1000 ms	
			Wrong checksum received	= true	AND Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS AND No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS AND Delay counter for activating CAN diagnosis	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 sec		
Reductant Control Module Sensor Reference Voltage 2 Low Voltage	P10C9	Reductant control module sensor 5V supply low voltage detection	Sensor supply voltage (filtered value)	< 4.502 V	Delay time AND Basic enable conditions met for FID_ERR_VCC[0] AND No pending or confirmed DTC's for FID_ERR_VCC[0]	>= 2 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1200 ms	Type A
Reductant Control Module Sensor Reference Voltage 2 High Voltage	P10CA	Reductant control module sensor 5V supply high voltage detection	Sensor supply voltage (filtered value)	> 5.498 V	Delay time AND Basic enable conditions met for FID_ERR_VCC[0] AND No pending or confirmed DTC's for FID_ERR_VCC[0]	>= 2 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1200 ms	Type A
Reductant Heater 1 Control Circuit Shorted	P10D9	This diagnostic detects an external short circuit on the reductant tank heater low side control circuit. Detects a short from low side to high side.	Feedback from SCV7518 tank heater driver	= SCB	Measured battery voltage at Heater supply	> 0 V	1 s	Type A
			Feedback from SCV7518 line heater driver	≠ SCB	Heater driver state	No_DIAG		
			HS feedback voltage	<3V	number recurrences for stable state	>= 5		
			Voltage measured on tank heater LS current shunt	>0,2V AND <4,998V	Urea pressure line heater duty cycle)	>15 %		
			Voltage measured on line heater LS current shunt	<0,2V				
			Voltage on HS measuring point	>1,7V	Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Control Module Ignition On/Start Switch Circuit High Voltage	P10DA	Ignition run/crank input is high, when it is expected to be low	HW ignition source	= High	Basic enable conditions met for FID_ERR_IGK_CAN_PLAUS[0] AND	= see Auxiliary Enable Conditions Flags in FARM_SumTab	1000 ms	Type A
			CAN ignition source	= Low	No pending or confirmed DTC's for FID_ERR_IGK_CAN_PLAUS[0] External inhibition flag Timer to inhibit the diagnosis	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab =0 =0		
Reductant Control Module Ignition On/Start Switch Circuit Low Voltage	P10DB	Run/crank input is low, when it is expected to be high	HW ignition source	= Low	Basic enable conditions met for FID_ERR_IGK_CAN_PLAUS[0] AND	= see Auxiliary Enable Conditions Flags in FARM_SumTab	1000 ms	Type A
			CAN ignition source	= High	No pending or confirmed DTC's for FID_ERR_IGK_CAN_PLAUS[0] External inhibition flag	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab =0		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Timer to inhibit the diagnosis	=0		
Reductant Control Module Heater Supply Circuit Low Voltage	P10DC	Reductant heater supply voltage low detection	Battery voltage - heater supply voltage	> 4V	Battery voltage wakeup is present Battery voltage threshold Sensor Bus wake up Timer to inhibit the diagnosis	=1 (True) >= 9V =1 (True) =0	1000 ms	Type A
Reductant Control Module Heater Supply Circuit High Voltage	P10DD	Reductant heater supply voltage high detection	Heater supply voltage - battery voltage	> 4V	VB sensor supply switch Battery voltage threshold Sensor Bus wake up Timer to inhibit the diagnosis	=1 (True) >= 9V =1 (True) =0	1000 ms	Type B
Reductant Heater 1 High Control Circuit	P10DE	This diagnostic detects an internal (HS MOSFET) open circuit on the reductant tank/line heater high side voltage supply.	Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point	= STATE OL = STATE OL <3V <0,2V <0,2V >1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V DIAG 2 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 1 High Control Low Voltage	P10DF	This diagnostic detects a short to ground on the reductant tank heater high side voltage supply.	Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point	= SCG = SCG >3V <0,2V <0,2V <0,27	Measured battery voltage at Heater supply number recurrences for stable state Heater driver state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V >= 5 = DIAG 2 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 1 High Control High Voltage	P10E0	This diagnostic detects an external short to power on the reductant tank heater high side voltage supply.	Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage measured on line heater LS current shunt	= No SCB = No SCG_OL >3V >0,2V AND <4,998V <0,2V >1,7V	Measured battery voltage at Heater supply Heater driver state Urea pressure line heater duty cycle) number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 2 = 0 % >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 1 Internal Control Circuit	P10EF	This diagnostic detects an internal open circuit on the reductant tank heater low side driver circuit.	Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point	= SCB = OL >3V <0,2V <0,2V >0,27V <1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 4 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 1 Internal Control Circuit Shorted	P10F0	This diagnostic detects an internal short circuit on the reductant tank heater low side driver circuit. The LS FET is stuck on.	Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point	= SCG = No SCG_OL <3V >0,2V AND <4,998V <0,2V >1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Urea pressure line heater duty cycle) Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG Get FARM Permission	> 0 V = DIAG 2 >= 5 > 15 % = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 2 Internal Control Circuit	P10F1	This diagnostic detects an internal open circuit on the reductant line heater low side driver circuit.	Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt	= OL = SCB >3V <0,2V <0,2V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state	> 0 V = DIAG 3 >= 5	1 s	Type A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
				>0,27V	Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
			Voltage on HS measuring point	<1,7V	AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Heater 2 Internal Control Circuit Shorted	P10F2	This diagnostic detects an internal short circuit on the reductant line heater low side driver circuit. The LS FET is stuck on.	Feedback from SCV7518 tank heater driver	= No SCG_OL	Measured battery voltage at Heater supply	> 0 V	1 s	Type A
			Feedback from SCV7518 line heater driver	= SCG	Heater driver state	= DIAG 2		
			HS feedback voltage	<3V	number recurrences for stable state	>= 5		
			Voltage measured on tank heater LS current shunt	<0,2V	Urea pressure line heater duty cycle)	> 15 %		
			Voltage measured on line heater LS current shunt	>0,2V AND <4,998V				
			Voltage on HS measuring point	>1,7V	Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Heater 2 Control Circuit Shorted	P10F3	This diagnostic detects an external short circuit on the reductant line heater low side control circuit. Detects a short from low side to high side.	Feedback from SCV7518 tank heater driver	= No SCB	Measured battery voltage at Heater supply	> 0 V	1 s	Type A
			Feedback from SCV7518 line heater driver	= SCB	Heater driver state	= No_DIAG		
			HS feedback voltage	<3V	number recurrences for stable state	>= 5		
			Voltage measured on tank heater LS current shunt	<0,2V	Urea pressure line heater duty cycle)	>15 %		
			Voltage measured on line heater LS current shunt	>0,2V AND <4,998V				
			Voltage on HS measuring point	>1,7V	Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG AND No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Control Module Not Programmed	P10F4	This diagnostic checks if the reductant control module has been programmed with application specific software and calibration information. Service parts are shipped with non-functional software and/or calibration and must be programmed before they can be used	Calibration indicating module not programmed	=1 (invalid)	Reductant controller is awake	= true	100 ms	Type A
Reductant Control Module System Voltage Low	P1465	Reductant control module system voltage too low	Measured (filtered) battery voltage	< 9 V	Reductant controller is awake AND Basic enable conditions met for FID_ERR_VP_PWR_L[0] AND No pending or confirmed DTC's for FID_ERR_VP_PWR_L[0]	= true = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	300 ms	Type C
Reductant Control Module System Voltage High	P1466	Reductant control module system voltage too high	Measured (filtered) battery voltage	> 16 V	Reductant controller is awake AND Basic enable conditions met for FID_ERR_VP_PWR_H[0] AND No pending or confirmed DTC's for FID_ERR_VP_PWR_H[0]	= true = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	300 ms	Type C
Reductant Level Sensor "A" Rate of Change Above Threshold	P14D0	If the consumed urea volume (calculated based on urea tank level) minus expected consumed urea volume (based on injected urea volume) divided by expected consumed urea volume (based on injected urea volume) exceeds an upper calibrated threshold for a calibrated period of time, a fault is detected	(Consumed urea volume (calculated based on urea tank level) minus expected consumed urea volume (based on injected urea volume)) divided by expected consumed urea volume (based on injected urea volume)	> 50 %	(Estimated amount of liquid urea remaining in urea tank Estimated amount of liquid urea remaining in urea tank) Basic enable conditions met for FID_ERR_RAG_CNS_RTL AND No pending or confirmed DTC's for FID_ERR_RAG_CNS_RTL Urea in urea tank is frozen (*) Bit-mask (LF_RTL_SENS_MES_VLD_DET.bit0) to release the validity of urea tank level information Reducing agent tank refill was detected. The level based consumtion monitor shall be reset. Reducing agent consumption monitor (level based) enable delay to give the tank volume determination time to adjust the real volume (after detected refill) Urea dosing system is active (*) Case 1 (favourable conditions for start) (Urea tank level sensor signal [0] filter is running for time Urea tank level sensor signal [1] filter is running for time Absolute value of difference between fast filtered value and slow filtered value of urea tank volume Reducing agent refilling check (small amount or late refill) performed and tank level is updated	>= 2,5l <= 11,0 l = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = false = 1 (see SummTable Bit-Definitions) = false = false = true >= 60 sec >= 60 sec <= 0.0996 l = true	Depends on DEF consumption rate. Need to consume 1.25 l of reductant.	Type B

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Estimated vehicle acceleration (Bit-mask to release the validity of urea tank level information)	= 1		
					Vehicle speed	> 0.000000 kph		
					Case2 (conditions for end)			
					Urea consumed since last monitor reset	>= 0.2500 l		
					FOR			
					Number of valid reducing agent consumption monitor diagnosis windows before calculating the final result	>4		
					AND			
					(Urea tank level sensor signal [0] filter is running for time	>= 60 sec		
					Urea tank level sensor signal [1] filter is running for time	>= 60 sec		
					Absolute value of difference between fast filtered value and slow filtered value of urea tank volume	<= 0.0996 l		
					Reducing agent refilling check (small amount or late refill) performed and tank level is updated	= true		
					Vehicle speed	> 0.000000 kph		
Reductant Level Sensor "A" Rate of Change Below Threshold	P14D1	If the consumed urea volume (calculated based on urea tank level) minus expected consumed urea volume (based on injected urea volume) divided by expected consumed urea volume (based on injected urea volume) falls below an upper calibrated threshold for a calibrated period of time, a fault is detected	(Consumed urea volume (calculated based on urea tank level) minus expected consumed urea volume (based on injected urea volume)) divided by expected consumed urea volume (based on injected urea volume)	< -50 %	(Estimated amount of liquid urea remaining in urea tank	>= 2.5 l	Depends on DEF consumption rate. Need to consume 1.25 l of reductant.	Type B
					Estimated amount of liquid urea remaining in urea tank)	<= 11 l		
					Basic enable conditions met for FID_ERR_RAG_CNS_RTL	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					AND No pending or confirmed DTC's for FID ERR RAG CNS RTL	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM SumTab		
					Urea in urea tank is frozen (*)	= false		
					Bit-mask (LF_RTL_SENS_MES_VLD_DET.bit0) to release the validity of urea tank level information	= 1		
					Reducing agent tank refill was detected. The level based consumtion monitor shall be reset.	= false		
					Urea dosing system is active (*)	= true		
					Case 1 (favourable conditions for start)			
					(Urea tank level sensor signal [0] filter is running for time	>= 60 sec		
					Urea tank level sensor signal [1] filter is running for time	>= 60 sec		
					Absolute value of difference between fast filtered value and slow filtered value of urea tank volume	<= 0.0996 l		
					Reducing agent refilling check (small amount or late refill) performed and tank level is updated	= true		
					Estimated vehicle acceleration (Bit-mask to release the validity of urea tank level information)	= 1		
					Vehicle speed	> 0.000000 kph		
					Case2 (conditions for end)			
					Urea consumed since last monitor reset	>= 0.3000 l		
					FOR			
					Number of valid reducing agent consumption monitor diagnosis windows before calculating the final result	>4		
					AND			
					(Urea tank level sensor signal [0] filter is running for time	>= 60 sec		
					Urea tank level sensor signal [1] filter is running for time	>= 60 sec		
					Absolute value of difference between fast filtered value and slow filtered value of urea tank volume	<= 0.0996 l		
					Reducing agent refilling check (small amount or late refill) performed and tank level is updated	= true		
					Vehicle speed	> 0.000000 kph		
Reductant Level Sensor Performance	P203B	This diagnostic performs 3 tests. The first test checks if the direct level measurement is plausible. A failure is detected when the measured level (fluid height) is greater than the physical height of the reductant tank for a number of measurements made over a prescribed distance while vehicle speed is greater than a threshod. The second test detects if the direct level (piezo TD2) measurement is not available for too great a distance driven within a measurement window. The sensor sends out direct level = $FFFA when signal is not available (SNA) The third test checks if the level measurement values are not updated within the expected time frame	Test 1: RTL SENS MAX DIAG 0 Filtered value of direct urea tank level sensor measurement AND The above condition is true for this percentage of the time (distance) that the diagnostic is enabled	 > 143mm >= 96%	Vehicle speed Bit-mask (lf_rtl_sens_mes_vld_det in SummTable Bit-Definitions) to release the validity of urea tank level information (*) Logical field containing the validity status of the reducing agent supply levels information for static case (LF_RTL_MES_VLD_DET_STAT_CDN[0] in SummTable Bit-Definitions) for distance traveled Basic enable conditions met for FID ERR RTL SENS MAX DIAG[0] No pending or confirmed DTC's for FID ERR RTL SENS MAX DIAG[0]	>= 7km/h 10111001 bit0=true bit3=true bit4=true bit5=true bit7=true 10100000 bit5=true bit7=true >= 1.5 km = see Auxiliary Enable Conditions Flags in FARM SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM SumTab	100 ms after driven distance of 1.5 km	Type B
			Test 2: RTL SENS SIG NOT AVL 0 Distance driven with direct level sensor not available - distance driven with diagnostic enabled over accumulated distance traveled window	 <= 0.0 km >= 1 km	Estimated amount of liquid urea remaining in urea tank Vehicle speed (Vehicle acceleration for time) Basic enable conditions met for FID ERR RTL SIG NOT AVL[0] No pending or confirmed DTC's for FID ERR RTL SIG NOT AVL[0]	>= 4 l >=7km/h <= 1 [m/s^2] >= 2 sec = see Auxiliary Enable Conditions Flags in FARM SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM SumTab	500 ms after required driving distance window	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Absolute measured filtered value of urea tank level direct piezo sensor Bit-mask to release the validity of urea tank level information (*) Bit-mask to release the validity of urea tank level information (*) Bit-mask to release the validity of urea tank level sensor information (*)	<= 655,35 mm 0000 0000 1001 1000 bit3 = true bit4 = true bit7 = true See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det 0010 0000 1000 0000 bit7 = true bit13 = true See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det 0000 0011 0000 0000 bit8 = true bit9 = true See SummTable Bit-Definitions for lf_state_rag_tank_sens		
			Test 3: UCLS_MES_TOUT Level sensor measurement update flag For expected periodic update rate	 = 0 [False] >1.2 s	Basic enable conditions met for FID_ERR_UCLS_MES_TOUT No pending or confirmed DTC's for FID_ERR_UCLS_MES_TOUT initial delay time of condition	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 s	60 s	
Reductant Level Sensor Circuit High Voltage	P203D	This diagnostic performs 2 tests. The first test checks for an electrical fault (OC, or SC) with the direct level measurement transducer (TD2) and the second test checks for an internal ASIC memory or DPU fault. The level sensor transmits this fault status information to the Reductant Control Module, The sensor output for direct level is set to $FFFA in case a fault is detected.	Test 1: UCLS_NOT_VLD_1 Urea tank data value received flag - urea tank direct sensor short circuit/open circuit detected for every new measurement cycle via SENT	 = true = 0.5 sec	Basic enable conditions met for FID_ERR_UCLS_NOT_VLD No pending or confirmed DTC's for FID_ERR_UCLS_NOT_VLD initial delay time of condition	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 600 ms	9 s	Type A
			Test 2: UCLS_NOT_VLD_3 Urea tank data value received - urea tank sensor - ASIC error for every new measurement cycle via SENT	 = true = 0.5 sec			3 s	
Reductant Pressure Sensor Performance	P204B	This diagnostic performs 2 tests. In the first test, the reductant control module compares the measured reductant pressure before the pressure build is commanded at startup, with the ambient (barometric) air pressure. In the second test, the measured reductant pressure after shutdown is compared with the ambient (barometric) air pressure. If the reductant pressure is too low, this diagnostic reports a failure.	Test 1: PRS_RAG_NEG_OFS_1 Measured urea pressure sensor signal - ambient air pressure (before pressure build up)	 < -95.020 kPa	no: clear of pressure sensor negative offset 1 diagnosis no: restart of pressure sensor negative offset 1 diagnosis no: last power latch not valid >> correct / compleated purge process before Urea volume downstream urea supply pump Urea dosing valve needle movement check is completed (deicing compleated) delay timer for pressure offset diagnosis; additional opening time of the injector for pressure equalization in case of pressure deviation Basic enable conditions met for FID_ERR_PRS_RAG_OFS_1 No pending or confirmed DTC's for FID_ERR_PRS_RAG_OFS_1	= false (see SummTable Bit-Definitions for lv_clr_dgo_prs_rag_neg_ofs_1) = false (see SummTable Bit-Definitions for lv_rest_dgo_prs_rag_neg_ofs_1) = false (see SummTable Bit-Definitions for lv_pwl_lst_not_vld) < 655.35 cm³ (655.35 ml) = true (see SummTable Bit-Definitions for lv_rdu_anst_cmpl) = 2.2 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	2.2 s	Type A
			Test 2: PRS_RAG_NEG_OFS_2 Measured urea pressure sensor signal - ambient air pressure (after engine stop)	 < -95.020 kPa	purging during power latch completed no: clear of pressure sensor negative offset 2 diagnosis no: restart of pressure sensor negative offset 2 diagnosis no: purging active deicing completed Basic enable conditions met for FID_ERR_PRS_RAG_OFS_2 No pending or confirmed DTC's for FID_ERR_PRS_RAG_OFS_2	= true (see SummTable Bit-Definitions for lv_rag_vol_purge_cmpl) = false (see SummTable Bit-Definitions for lv_clr_dgo_prs_rag_neg_ofs_2) = false (see SummTable Bit-Definitions for lv_rest_dgo_prs_rag_neg_ofs_2) = false (see SummTable Bit-Definitions for lv_rag_vol_purg_act) = false (see SummTable Bit-Definitions for lv_rag_wup_heat_cmpl) = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	100 ms	
Reductant Pressure Sensor Circuit Low Voltage	P204C	The pressure sensor is a smart device. It detects if there are internal errors with the pressure sensor, including power supply, electrical circuit and overflow faults. The reductant control module receives out of range data values from the sensor in case these faults are present.	Test: RAG_PRS_NOT_VLD_0 Sensor output (sensor internal diagnostic error) OR Sensor output (sensor internal diagnostic error)	 = 4090 dez (FFA hex) = 4091 dez (FFb hex)	deicing completed delay diagnosis after activation conditions fulfilled >> delay only after reset (initialization); else always active Basic enable conditions met for FID_ERR_RAG_PRS_NOT_VLD No pending or confirmed DTC's for FID_ERR_RAG_PRS_NOT_VLD	= true (see SummTable Bit-Definitions for lv_rag_wup_heat_cmpl) = 100 ms = see Auxiliary Enable Conditions Flags in FARM_BitDef = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_BitDef	1.2 s	Type A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant System Performance	P204F	This diagnostic checks if the quantity of reductant delivered with each pump revolution is less than a threshold. A failure may indicate that there is excessive air in the system, or the pump performance has degraded.	Test: PUMP_AIR average displacement volume per pump revolution	 ≤ 0.014 cm³ (14 µl) (see figure 30 in SummTable Curves - Maps)	Basic enable conditions met for FID_ERR_RAG_PUMP_DMG_CTL[1] No pending or confirmed DTC's for FID_ERR_RAG_PUMP_DMG_CTL[1] clear diagnosis for the plausibility for pump pressure control diagnosis restart diagnosis for the plausibility for pump pressure control diagnosis pressure control activated State of the reducing agent pump motor controller Estimated pump temperature Battery voltage estimation with high resolution Max selection of "Requested reducing agent volumetric flow" (ECM requesed mass flow) and "Mean value of reducing agent dosing request volume flow during the pump flow calculation window" (Filtered ECM requested mass flow) number of required pump rotations (to calculate the average displacement volume) to increase the debounce counter Number of updates of average displacement volume per rotation debounce counter for pump pumping air	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = false (see SummTable Bit-Definitions for lv_clr_err_prs_pump_ctl [1]) = false (see SummTable Bit-Definitions for lv_rest_err_prs_pump_ctl [1]) = true (see SummTable Bit-Definitions for lv_prs_ctl_rag_on) ≠ RECOVERY ≥ -0.02°C > 0V ≥ 10µl ≥ 24 ≥ 9 >= 8	216 pump rotations (Depends on DEF consumption)	Type B
Reductant Tank Temperature Sensor Performance	P205B	Reductant temperature as measured by the PTS (Pressure Temperature Sensor) is compared to the reductant tank temperature sensor measured by the level-quality sensor, and the Average Engine Startup Reference Temperature received from the ECM after a sufficient period with the engine off (e.g. 8 hrs). A fault is detected if the difference in temperatures exceeds a high or low threshold	Test 1: CST_TEMP_RAG_PRS_H Urea tank temperature stored at engine start minus urea pressure sensor temperature stored at engine start AND Average Engine Stratup Reference Temperature from ECM stored at engine start minus urea pressure sensor temperature stored at engine start)	 < -30.025 DegC < -30.025 DegC	(Ignition on for time) Basic enable conditions met for FID_ERR_CRCH_RAG_TEMP_HLD No pending or confirmed DTC's for FID_ERR_CRCH_RAG_TEMP_HLD Basic enable conditions met for FID_ERR_CRCH_TEMP_RASL No pending or confirmed DTC's for FID_ERR_CRCH_TEMP_RASL Engine off time Measured ambient air temperature (Urea tank refill detected (*) for time)	= true >= 8,5 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 28800 sec >= -40 DegC = false >= 43200 sec	10 s	Type A
			Test 2: CST_TEMP_RAG_PRS_L Urea tank temperature stored at engine start minus urea pressure sensor temperature stored at engine start AND Average Engine Stratup Reference Temperature from ECM stored at engine start minus urea pressure sensor temperature stored at engine start)	 > 30.0375 DegC > 30.0375 DegC				
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	This diagnostic detects if the temperature sensor within the smart pressure sensor is out of range high/low. This includes detection for electrical circuit faults.	Test: RAG_PRS_NOT_VLD_1 Urea pressure-temperature sensor data value on SENT	 = 2051 dez (803 hex)	Minimum of ambient air temperature or reductant tank temperature delay timer expired electrical pressure sensor diagnosis after activation conditions fulfilled >> delay only after reset (initialization); else activation: always Basic enable conditions met for FID_ERR_RAG_PRS_NOT_VLD No pending or confirmed DTC's for FID_ERR_RAG_PRS_NOT_VLD	>= -37.46°C = 100 ms = see Auxiliary Enable Conditions Flags in FARM_BitDef = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_BitDef	1.2 s	Type A
Reductant Tank Temperature Sensor Circuit Erratic	P205E	The Reductant Control Module determines that the reductant temperature from the pressure temperature sensor changes too quickly	Test: TEMP_GRD_RASL_0 gradient of reductant temperature signal	 >= 1.6 deg C/sec	Basic enable conditions met for FID_ERR_TEMP_GRD_RASL[0] No pending or confirmed DTC's for FID_ERR_TEMP_GRD_RASL[0] Time delay for steady conditions	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 5 sec	After secondary parameters are fulfilled recurrence: 100ms max 20,5 s	Type A

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant Quality Sensor Circuit Performance	P206B	This diagnostic performs 3 tests. The first test checks if the urea concentration signal does not change for a certain driving distance.. The second test detects if the urea concentration (TD1) measurement is not available for too great a distance driven within a measurement window. The sensor sends out direct level = $FFFA when signal is not available (SNA) The third test checks if the level/concentration measurement values are not updated within the expected time frame	Test 1: CONC_RAG_STUCK_DIAG Absolute value of urea concentration change from one measurement to the next	< 0.01 %	Urea tank quality sensor signal stuck in range is active when the following conditions are fulfilled: ((Measured value of urea tank level combi piezo sensor AND Measured value of urea tank level combi piezo sensor) OR Estimated amount of liquid urea remaining in urea tank) Vehicle speed Vehicle acceleration External status conditions of the sensor must be OK for accumulated distance traveled Basic enable conditions met for FID_ERR_CONC_RAG_STUCK_DIAG No pending or confirmed DTC's for FID_ERR_CONC_RAG_STUCK_DIAG	<= 143 mm >= 17 mm > 4 l >= 7km/h >= 0.4 m/sec^2 = 1 (see SummTable Bit-Definitions for LV_CONC_RAG_MES_VLD) >= 3.5 km = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	100 ms after required driving distance window	Type A
			Test 2: RTL_SENS_SIG_NOT_AVL_0 Distance driven with concentration sensor not available - distance driven with diagnostic enabled over accumulated distance traveled window	<= 0.0 km >= 1 km	Estimated amount of liquid urea remaining in urea tank Vehicle speed (Vehicle acceleration for time) Basic enable conditions met for NC_FID_ERR_RTL_SIG_NOT_AVL[2] No pending or confirmed DTC's for NC_FID_ERR_RTL_SIG_NOT_AVL[2] Absolute measured filtered value of urea tank level combi piezo sensor Bit-mask to release the validity of urea tank level information (*) Bit-mask to release the validity of urea tank level information (*) Bit-mask to release the validity of urea tank level sensor information (*)	>= 4 l >=7km/h <= 1 [m/s^2] >= 2 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab <= 143 mm 0010 0100 0000 1000 bit3 = true bit10 = true bit13 = true (see SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det) 0010 0000 1000 0000 bit7 = true bit13 = true (see SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det) 0000 0011 0000 0000 bit8 = true bit9 = true (see SummTable Bit-Definitions for lf_state_rag_tank_sens)	500 ms after required driving distance window	
			Test 3: UCLS_MES_TOUT Level sensor measurement update flag For expected periodic update rate	= 0 [False] >1.2 s	Basic enable conditions met for FID_ERR_UCLS_MES_TOUT No pending or confirmed DTC's for FID_ERR_UCLS_MES_TOUT initial delay time of condition	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 1 s	60 s	
Reductant Quality Sensor Circuit High Voltage	P206D	This diagnostics performs 2 tests. In the first test, the sensor detects an electrical fault (OC, or SC) with the combi level/concentration measurement transducer (TD1). In the second test the sensor detects ASIC memory or DPU faults. The sensor output for the combi level, direct level and urea concentration is set to $FFFA in case of a fault.	Test 1: UCLS_NOT_VLD_0 Urea tank data value received - combi piezo sensor short circuit/open circuit for every new measurement cycle via SENT	= true = 0.5 sec	Basic enable conditions met for FID_ERR_UCLS_NOT_VLD No pending or confirmed DTC's for FID_ERR_UCLS_NOT_VLD	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	9 s	Type A
			Test 2: UCLS_NOT_VLD_3 Urea tank data value received - urea tank sensor - ASIC error for every new measurement cycle via SENT	= true = 0.5 sec	initial delay time of condition	>= 600 ms	3 s	
Reductant Pump Control Circuit	P208A	The reductant control module detects a low voltage at the output driver stage of one of the 3 pump phases, while the voltage at the other stages are within range. This condition corresponds to an open circuit condition at that pump phase.	Test: EM_RAG_OPEN_LOAD_DR Pump driver (ATIC 107) diagnostic state - Bit 1	= 1	Battery voltage - filtered value Relative speed set point for urea supply pump motor control Basic enable conditions met for FID_ERR_EM_RAG_OPEN_LOAD_DR No pending or confirmed DTC's for FID_ERR_EM_RAG_OPEN_LOAD_DR	> 0 V <= 0.122 % = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	100 ms	Type A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant Pump Performance	P208B	The reductant control module compares the reductant pump speed control setpoint with the measured reductant pump speed. This diagnostic will report a failure if this difference is too great.	Test: EM_RAG_CTL_SP Absolute value of commanded reductant pump motor speed - measured reductant pump motor speed AND Time that error condition is present	 > 300 rpm > = 5000 ms	Battery voltage - filtered value Filtered reductant pump mesured speed Electrical machine discrete mode active (*) Urea supply pump motor speed set point Basic enable conditions met for FID_ERR_EM_RAG_CTL_SP No pending or confirmed DTC's for FID_ERR_EM_RAG_CTL_SP	> 0 V > = 60 rpm = false (see SummTable Bit-Definitions for lv_act_dis_mod) >= 300 rpm = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	5 s	Type A
Reductant Pump Control Circuit Low Voltage	P208C	The reductant control module detects a low voltage at the output driver stage of any of the 3 reductant pump phases. This condition corresponds to a short to ground condition at a pump phase.	Test: EM_RAG_PUMP_SCG Pump driver (ATIC 107) diagnostic state - Bit 2 OR Pump driver (ATIC 107) diagnostic state - Bit 4 OR Pump driver (ATIC 107) diagnostic state - Bit 6 OR [illegible]	 = 1 = 1 = 1 [illegible]	Battery voltage - filtered value Basic enable conditions met for FID_ERR_EM_RAG_PUMP_SCG No pending or confirmed DTC's for FID_ERR_EM_RAG_PUMP_SCG Speed set point for pump motor control	> 0 V = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = 0 rpm	50 ms	Type A
Reductant Pump Control Circuit High Voltage	P208D	The reductant control module detects a high voltage at the output driver stage of any of the 3 reductant pump phases. This condition corresponds to a short to power condition at a pump phase.	Test: EM_RAG_PUMP_SCB Pump driver (ATIC 107) diagnostic state - Bit 3 OR Pump driver (ATIC 107) diagnostic state - Bit 5 OR Pump driver (ATIC 107) diagnostic state - Bit 7 OR Pump driver (ATIC 107) diagnostic state - Bit 10	 = 1 = 1 = 1 = 1	Battery voltage - filtered value Basic enable conditions met for FID_ERR_EM_RAG_PUMP_SCB No pending or confirmed DTC's for FID_ERR_EM_RAG_PUMP_SCB	> 0 V = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	50 ms	Type A
Reductant Heater 1 Control Circuit	P20B9	This diagnostic detects an external open circuit on the reductant tank heater low side control circuit.	Test: RAG_HEAT_OC_0 Feedback from SCV7518 tank heater driver Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point Voltage on HS measuring point	 = No SCB = OL >3V <0,2V <0,2V >0,27V <1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 4 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 1 Performance	P20BA	This diagnostic detects if the reductant tank heating power is too low or too high (The heater power power setpoint minus the measured heater power is greater than a threshold.)	Test 1: POW_L_RAG_HEAT_TANK 100*(Measured heating power of the urea tank heater minus heating power set point) divided by heating power set point Test 2 POW_H_RAG_HEAT_TANK 100*(Measured heating power of the urea tank heater minus heating power set point) divided by heating power set point	 <= -60 % >= 25 %	Basic enable conditions met for FID_ERR_POW_RAG_HEAT_TANK No pending or confirmed DTC's for FID_ERR_POW_RAG_HEAT_TANK Enabling conditions for FID_POW_RAG_HEAT_TANK_INTV Battery voltage - filtered value (Reductant tank heater duty cycle for time)	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab ≠ inhibiting conditions in FARM_SumTab 0V >= 90.002 % >= 120 sec	10 s	Type A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant Heater 1 Control Circuit Low Voltage	P20BB	This diagnostic detects an external short to ground on the reductant tank heater low side control circuit.	Test: RAG_HEAT_L_SIDE_SCG_0 Feedback from SCV7518 tank heater driver Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point AND Voltage on HS measuring point	 = SCG = No SCG_OL <3V <0,2V <0,2V >1,7V >1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 2 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 1 Control Circuit High Voltage	P20BC	This diagnostic detects an external short to power on the reductant tank heater low side control circuit.	Test: RAG_HEAT_L_SIDE_SCB_0 Feedback from SCV7518 tank heater driver Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point AND Voltage on HS measuring point	 = SCB = No SCG_OL >3V <0,2V <0,2V >1,7V >1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 4 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 2 Control Circuit	P20BD	This diagnostic detects an external open circuit on the reductant line heater low side control circuit.	Test: RAG_HEAT_OC_1 Feedback from SCV7518 tank heater driver Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point AND Voltage on HS measuring point	 = OL = No SCB >3V <0,2V <0,2V >0,27V <1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 3 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 2 Performance	P20BE	This diagnostic detects if the reductant line heating power is too high or too low. (The measured heater power minus the heater power setpoint is greater than or less than a threshold.)	Test 1: POW_H_RAG_HEAT_TUBE 100*(Measured heating power of the urea pressure line heater minus heating power set point) divided by heating power set point Test 2 POW_L_RAG_HEAT_TUBE 100*(Measured heating power of the urea pressure line heater minus heating power set point) divided by heating power set point	 >= 50% <= -50%	Basic enable conditions met for FID_ERR_POW_RAG_HEAT_TUBE No pending or confirmed DTC's for FID_ERR_POW_RAG_HEAT_TUBE Enabling conditions for FID_POW_RAG_HEAT_TUBE_INTV Battery voltage - filtered value (Reductant pressure line heater duty cycle for time)	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab ≠ inhibiting conditions in FARM_SumTab 0 V >= 90.002 % >= 10 sec	10 s	Type A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant Heater 2 Control Circuit Low Voltage	P20BF	This diagnostic detects an external short to ground on the reductant line heater low side control circuit.	Test: RAG_HEAT_L_SIDE_SCG_1 Feedback from SCV7518 tank heater driver Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point	 = No SCG_OL = SCG <3V <0,2V <0,2V >1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V = DIAG 2 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Heater 2 Control Circuit High Voltage	P20C0	This diagnostic detects an external short to power on the reductant line heater low side control circuit.	Test: RAG_HEAT_L_SIDE_SCB_1 Feedback from SCV7518 tank heater driver Feedback from SCV7518 tank heater driver Feedback from SCV7518 line heater driver HS feedback voltage Voltage measured on tank heater LS current shunt Voltage measured on line heater LS current shunt Voltage on HS measuring point	 = No SCG_OL = SCB >3V <0,2V <0,2V >1,7V	Measured battery voltage at Heater supply Heater driver state number recurrences for stable state Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	> 0 V DIAG 3 >= 5 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	1 s	Type A
Reductant Low Pressure	P20E8	This diagnostic performs 2 tests. The first test checks if the reductant setpoint pressure minus the measured reductant pressure is greater than a threshold, indicating that the reductant pressure is too low. The second test checks if the reductant pressure does not increase sufficiently during the pressure build up phase. The pressure is too low after a period of time has elapsed during the pressure build up phase.	Test 1: PRS_BOL_1_PLAUS_RNG Filtered value of reductant pressure setpoint - measured reductant pressure	 > 200 kPa	initialization request for plausibility diagnosis pressure control active deicing completed standby phase during refilling active State of the reducing agent pump motor controller Basic enable conditions met for FID_ERR_PRS_RAG_ORNG_PLAUS No pending or confirmed DTC's for FID_ERR_PRS_RAG_ORNG_PLAUS All other enable conditions met for time Reductant consumed this driving cycle	= false (see SummTable Bit - Definitions for state_req_prs_bol_1_diag_rst_prev) = true (see SummTable Bit - Definitions for lv_prs_ctl_rag_on) = true (see SummTable Bit - Definitions for lv_rag_wup_heat_cmpl) = false (see SummTable Bit - Definitions for lv_rag_reac_fill_stb_pha_act) ≠ RECOVERY = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 12 sec >= 1200.0000 mg	1.50 s	Type A
			Test 2: PRS_L_INC_PUMP_ENA Reductant line filling process completed AND Delay time after engine start depending on measured urea pressure at engine start and whether Reductant Pump is speed limited during the refilling phase	 = false (see SummTable Bit-Definitions for lv_rag_fill_air_chk_cmpl >= 15 to 95 sec (see Figure 11 in SummTable CURVES - MAPS) if speed limited (see SummTable Bit - Definitions for lv_pwm_rag_pump_fill_lim) >= 20 to 130.0 sec (see Figure 12 in SummTable CURVES - MAPS) if not speed limited (see SummTable Bit - Definitions for lv_pwm_rag_pump_fill_lim)	(filling and air check functionality completed OR filling and air check activated) AND purging not active deicing completed Engine is running initialization request for plausibility diagnosis of low system pressure increase standby phase during refilling active Basic enable conditions met for ID_ERR_PRS_L_INC_PUMP_ENA No pending or confirmed DTC's for ID_ERR_PRS_L_INC_PUMP_ENA	= false = true (see SummTable Bit - Definitions for lv_rag_fill_air_chk_act) = false (see SummTable Bit - Definitions for lv_rag_vol_purge_act) = true (see SummTable Bit - Definitions for lv_rag_wup_heat_cmpl) = true = 0 (see SummTable Bit - Definitions for state_req_l_inc_prs_diag_rst) = false (see SummTable Bit - Definitions for lv_rag_reac_fill_stb_pha_act) = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	15.00 s to 95.00 s in normal mode 20.00s to 130.00s in pump limit mode	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant High Pressure	P20E9	This diagnostic performs 3 tests. The first test detects if the reductant pressure rises too quickly during the pressure build phase. The second test detects if the reductant pressure is too high after the purge event, because there was insufficient pressure drop during the purge. The third test checks if the reductant setpoint pressure minus the measured reductant pressure is less than a threshold, indicating that the reductant pressure is too high.	Test 1: PRS_H_INC_PUMP_ENA		purging active	= false (see SummTable Bit - Definitions for lv_rag_vol_purge_act)	0.20 s to 1.20 s in normal mode	Type A
			Measured reductant pressure after fill timer elapsed - reductant pressure stored at engine start	> 140.04 to 679.98 kPa (see Figure 16 in SummTable CURVES - MAPS)	deicing completed	= true (see SummTable Bit - Definitions for lv_rag_wup_heat_cmpl)	0.30 s to 1.80 s in pump limit mode	
					Engine speed (will be set to 2000rpm by DEF controler if CAN singal "engine running" is available) >> engine running	> 600 rpm		
					initialization request for plausibility diagnosis	= false (see SummTable Bit - Definitions for state_req_h_inc_prs_diag_rst_prev)		
					filling and air check completed	= true (see SummTable Bit - Definitions for lv_rag_fil_air_chk_cmpl)		
					OR			
					filling and air check activated	= true (see SummTable Bit - Definitions for lv_rag_fill_air_chk_act)		
					standby phase during refilling active	= false (see SummTable Bit - Definitions for lv_rag_reac_fill_stb_pha_act)		
					(Urea supply pump speed is limited during refilling phase	= false (see SummTable Bit - Definitions for lv_pwm_rag_pump_fill_lim)		
					Delay time after engine start depending on measured urea pressure at engine start)	>= 0.20 to 1.20 sec (see Figure 14 in SummTable CURVES- MAPS)		
					OR			
					(Urea supply pump speed is limited during refilling phase (*)	= true (see SummTable Bit - Definitions for lv_pwm_rag_pump_fill_lim)		
					Delay time after engine start depending on measured urea pressure at engine start)	>= 0.30 to 1.80 sec (see Figure 15 in SummTable CURVES- MAPS)		
					Basic enable conditions met for FID_ERR_PRS_H_INC_PUMP_ENA	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_PRS_H_INC_PUMP_ENA	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 2: PRS_L_DEC_PUMP_DI		(Urea supply pump speed is limited during purging phase	= false (see SummTable Bit - Definitions for lv_pwm_rag_pump_purge_lim)	6.00 s to 12.00 s in normal mode	
			Measured and filtered reductant pressure after purge event - measured reductant pressure before purge event	> -140.004 to 120.002 kPa (see Figure 22 in SummTable CURVES - MAPS)	waiting time after pump disable	>= 6 to 12 sec (see Figure 21 in SummTable CURVES- MAPS)	8.00 s to 14.00 s in pump limit mode	
					OR			
					(Urea supply pump speed is limited during purging phase	= true (see SummTable Bit - Definitions for lv_pwm_rag_pump_purge_lim)		
					waiting time after pump disable	>= 8.00 to 14.00 sec (see Figure 25 in SummTable CURVES- MAPS)		
					initialization request for plausibility diagnosis of low system pressure decrease	= 0 (see SummTable Bit - Definitions for state_req_l_dec_prs_diag_rst)		
					purging during power latch compleated	= true (see SummTable Bit - Definitions for lv_rag_vol_purge_cmpl)		
					OR			
					purging during power latch activated	= true (see SummTable Bit - Definitions for lv_rag_vol_purge_act)		
					deicing completed	= true (see SummTable Bit - Definitions for lv_rag_wup_heat_cmpl)		
					Basic enable conditions met for FID_ERR_PRS_L_DEC_PUMP_DI	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_PRS_L_DEC_PUMP_DI	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 3: PRS_TOL_1_PLAUS_RNG		initialization request for plausibility diagnosis	= false (see SummTable Bit - Definitions for state_req_prs_Tol_1_diag_rst_prev)	1.50 s	
			Reductant pressure setpoint - measured reductant pressure	< -179.980011 kPa	pressure control active	= true (see SummTable Bit - Definitions for lv_prs_ctl_rag_on)		
					deicing completed	= true (see SummTable Bit - Definitions for lv_rag_wup_heat_cmpl)		
					standby phase during refilling active	= false (see SummTable Bit - Definitions for lv_rag_reac_fill_stb_pha_act)		
					State of the reducing agent pump motor controller	≠ RECOVERY		
					Other enable conditions met for time	>= 4 sec		
					Urea consumption	>= 1200.0000 mg		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Basic enable conditions met for FID_ERR_PRS_RAG_ORNG_PLAUS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_PRS_RAG_ORNG_PLAUS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Control Module Performance	P20FF	This diagnostic performs 8 internal controller checks, including: 1. Ability to read/write RAM during the controller powerup, following initialization. 2. Checksum verification of the ROM (flash memory) partition containing the calibration during controller powerup, following initialization. 3. Checksum verification of the ROM (flash memory) partition containing the customer specific boot software during controller powerup, following initialization. 4. Checksum verification of the ROM (flash memory) partition containing the supplier specific boot software during controller powerup, following initialization. 5. Checksum verification of the ROM (flash memory) partition containing the application software during controller powerup, following initialization. 6. Ability to write to non-volatile memory 7. SPI communications with Reductant Pump Driver 8. SPI communications with Reductant Heater Low Side Driver	Test 1: ECU_1 Read and write ability check of RAM	= failed			Runs once during controller initialization	Type A
			Test 2: ECU_2_CKS_CAL Internal calibration checksum verification	= incorrect	Basic enable conditions met for FID_ERR_ECU_2 No pending or confirmed DTC's for FID_ERR_ECU_2	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 3: ECU_2_CKS_CBOOT Internal customer software checksum verification	= incorrect	Basic enable conditions met for FID_ERR_ECU_2 No pending or confirmed DTC's for FID_ERR_ECU_2	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 4: ECU_2_CKS_SBOOT Internal supplier software checksum verification	= incorrect	Basic enable conditions met for FID_ERR_ECU_2 No pending or confirmed DTC's for FID_ERR_ECU_2	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 5: ECU_2_CKS_SW Internal software checksum verification	= incorrect	Basic enable conditions met for FID_ERR_ECU_2 No pending or confirmed DTC's for FID_ERR_ECU_2	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 6: ECU_2_EEPROM NVMY malfunction during write operation	=1 (True)	Basic enable conditions met for FID_ERR_ECU_2 No pending or confirmed DTC's for FID_ERR_ECU_2	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	recurrence: 1000 ms c_abc_ini_typ_ecu_2_eeprom = 23	
			Test 7: EM_RAG_PUMP_SPI SPI pump communication state	= 2 (Failed)	Basic enable conditions met for FID_ERR_EM_RAG_PUMP_SPI No pending or confirmed DTC's for FID_ERR_EM_RAG_PUMP_SPI Battery voltage - filtered value	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab > 0 V	After secondary parameters are fulfilled recurrence: 10ms 0,03 sec c_abc_inc_EM_RAG_PUMP_SPI = 1 c_abc_ini_typ_EM_RAG_PUMP_SPI = 0 c_abc_max_EM_RAG_PUMP_SPI = 3 c_abc_max_EM_RAG_PUMP_SPI = 3	
			Test 8: RAG_L_SIDE_SPI_COM SPI communication to low side driver of urea supply system	= 2 (Failed)	Basic enable conditions met for FID_ERR_RAG_L_SIDE_SPI_COM No pending or confirmed DTC's for FID_ERR_RAG_L_SIDE_SPI_COM Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG Time delay for steady conditions	= see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab >= 2 sec	After secondary parameters are fulfilled recurrence: 10ms 1 sec c_abc_max_RAG_L_SIDE_SPI_COM = 100 c_abc_inc_RAG_L_SIDE_SPI_COM = 1 c_abc_ini_typ_RAG_L_SIDE_SPI_COM = 0	
Reductant Pump High Current	P214E	The reductant control module detects if the reductant pump driver stage current is too high.	Test: EM_RAG_OVER_CUR_DR Pump driver over current error code (Bit 15)	1 (Failure)	Battery voltage (filtered value) Absolute value of the demanded urea supply pump torque Relative speed set point for reductant pump motor control Basic enable conditions met for FID_ERR_EM_RAG_OVER_CUR_DR No pending or confirmed DTC's for FID_ERR_EM_RAG_OVER_CUR_DR	> 0 V >= 0.02 Nm > 0.122 % = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	500 ms	Type A
Reductant Tank Heater 1 High Current	P214F	This diagnostic detects if the reductant tank heater current is too high (exceeds a threshold).	Test: VP_CFB_RAG_HEAT_H_0 Internal amplified shunt voltage of urea tank heater driver stage at low side switch (offset corrected)	> 3 V (>17,6A)	(Comanded reductant tank heater duty cycle for number of events Basic enable conditions met for FID_ERR_VP_CFB_RAG_HEAT_ORNG[0] No pending or confirmed DTC's for FID_ERR_VP_CFB_RAG_HEAT_ORNG[0] Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG	>= 1.001 % >= 10 (100 ms) = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = see Auxiliary Enable Conditions Flags in FARM_SumTab	1 s	Type B

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Level Sensor 2 Performance	P21A9	This diagnostic performs 4 tests. The first test checks if the combi (or tube height TD1) level measurement is plausible. A failure is detected when the measured level (fluid height in the tube) is greater than the physical height of the reductant tank for a number of measurements made over a prescribed distance while vehicle speed is greater than a threshod. The second check rationalises the tube height level measurement with the direct level measurement. The third checks if the LQTS conbi (tube height) level (TD1) measurement is not available for too great a distance driven within a measurement window (e.g. 4km). The LQTS sends out tube height level = $FFFA when signal not available (SNA) The fourth test checks if the level measurement values are not updated within the expected time frame	Test 1: RTL_SENS_MAX_DIAG_1		Vehicle speed	>= 7km/h	After secondary parameters are fulfilled: 0.1 s C_ABC_INC_RTL_SENS_MAX_DIAG_1 = 1 C_ABC_MAX_RTL_SENS_MAX_DIAG_1 = 1 C_ABC_INI_TYP_RTL_SENS_MAX_DIAG_1 = 0	Type B
			Filtered value of combi urea tank level sensor measurement	> 143mm				
			AND The above condition is true for this percentage of the time (distance) that the diagnostic is enabled	>= 96%	Bit-mask to release the validity of urea tank level information (*)	10110000001001 bit0=true bit3=true bit10=true bit11=true bit13=true (See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det)		
					Logical field containing the validity status of the reducing agent supply levels information for static case (LF_RTL_MES_VLD_DET_STAT_CDN[1] in SummTable Bit-Definitions)	10000000 bit7=true (See SummTable Bit-Definitions for LF_RTL_MES_VLD_DET_STAT_CDN[1])		
					for distance traveled	>= 1.5 km		
					Basic enable conditions met for FID_ERR_RTL_SENS_MAX_DIAG[1]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RTL_SENS_MAX_DIAG[1]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 2: RTL_SENS_SIG_COMP		(Vehicle speed	>=30km/h	After secondary parameters are fulfilled: 0.1 s recurrence: 100 ms C_ABC_INC_RTL_SENS_SIG_COMP= 1 C_ABC_MAX_RTL_SENS_SIG_COMP = 1 C_ABC_INI_TYP_RTL_SENS_SIG_COMP = 0	
			((Absolute measured value of direct piezo minus combi piezo urea tank level sensor	>= 8.85 to 32.85 mm (see Figure 23 in SummTables CURVES - MAPS)				
			Absolute measured value of urea tank level combi piezo sensor)	<= 56.15 mm	Measured value of urea tank level direct piezo sensor	>= 17mm		
			OR		Measured value of urea tank level combi piezo sensor	>= 17mm		
			(Absolute measured value of urea tank level combi piezo sensor	> A - B	vehicle acceleration)	<= 0.3 m/s²		
			Where A = Absolute measured value of urea tank level direct piezo sensor		for time	>= 5 sec		
			B (Safety margin threshold value for urea tank level piezo sensor)))	= 0 to 80.73 mm (see Figure 24 in SummTables CURVES - MAPS)	Bit-mask to release the validity of urea tank level information (*))	1010 1100 1011 1000 Bit3=true bit4=true bit5=true bit7=true bit10=true bit11=true bit13=true (See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det)		
			The above condition is true for this percentage of the time (distance) that the diagnostic is enabled	>= 96%	Bit-mask to release the validity of urea tank combi piezo level information for static case	1000 0000 bit7=true (See SummTable Bit-Definitions for LF_RTL_MES_VLD_DET_STAT_CDN[1])		
					Basic enable conditions met for FID_ERR_RTL_SIG_COMP	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RTL_SIG_COMP	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					for accumulated distance traveled	>= 3 km		
			Test 3: RTL_SENS_SIG_NOT_AVL_1	<= 0.0 km	Estimated amount of liquid urea remaining in urea tank	>= 4 l	After secondary parameters are fulfilled: 0.5 sec recurrence: 100 ms C_ABC_INC_RTL_SENS_SIG_NOT_AVL_1 = 1 C_ABC_MAX_RTL_SENS_SIG_NOT_AVL_1 = 5 C_ABC_INI_TYP_RTL_SENS_SIG_NOT_AVL_1 = 0	
			Distance driven with direct level sensor not available - distance driven with diagnostic enabled for accumulated distance traveled)	>= 1 km	Vehicle speed	>=7km/h		
					(Vehicle acceleration	<= 1 [m/s^2]		
					for time)	>= 2 sec		
					Basic enable conditions met for FID_ERR_RTL_SIG_NOT_AVL[1]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RTL_SIG_NOT_AVL[1]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Absolute measured filtered value of urea tank level combi piezo sensor	<= 655,35 mm		
					Bit-mask to release the validity of urea tank level information (*)	0010 0100 0000 1000 bit3 = true bit10 = true bit13 = true (See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det)		
					Bit-mask to release the validity of urea tank level information (*)	0010 0000 1000 0000 bit7 = true bit13 = true (See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det)		
					Bit-mask to release the validity of urea tank level sensor information (*)	0000 0011 0000 0000 bit8 = true bit9 = true (See SummTable Bit-Definitions for lf_state_rag_tank_sens)		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Test 4: UCLS_MES_TOUT		Basic enable conditions met for FID_ERR_UCLS_MES_TOUT	= see Auxiliary Enable Conditions Flags in FARM_SumTab	60 s	
			Level sensor measurement update flag	= 0 [False]	No pending or confirmed DTC's for FID_ERR_UCLS_MES_TOUT	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			For expected periodic update rate	>1.2 s	initial delay time of condition	>= 1 s		
Reductant Level Sensor 2 Circuit High Voltage	P21AB	This diagnostics performs 2 tests. In the first test, the sensor detects an electrical fault (OC, or SC) with the combi level/concentration measurement transducer (TD1). In the second test the sensor detects ASIC memory or DPU faults. The sensor output for the combi level, direct level and urea concentration is set to $FFFA in case of a fault.	Test 1: UCLS_NOT_VLD_0		Basic enable conditions met for FID_ERR_UCLS_NOT_VLD	= see Auxiliary Enable Conditions Flags in FARM_SumTab	9 s	Type A
			Urea tank data value received - combi piezo sensor short circuit/open circuit	= true				
			for every new measurement cycle via SENT	= 0.5 sec	No pending or confirmed DTC's for FID_ERR_UCLS_NOT_VLD	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 2: UCLS_NOT_VLD_3				3 s	
			Urea tank data value received - urea tank sensor - ASIC error	= true				
			for every new measurement cycle via SENT	= 0.5 sec	initial delay time of condition	>= 600 ms		
Reductant Level Sensor 1 Stuck	P21C5	This diagnostic checks if the direct level measurement is stuck, by looking for a minimum change in the level measurement of the transducer (TD2) signal over a prescribed driven distance that includes some minimum levels of vehicle acceleration. The diagnostic reports a failure if the minimum signal change is not seen.	Test: RTL_SENS_STUCK_DIAG_0		((Measured value of urea tank level direct piezo sensor	>= 25 mm	100 ms after minimum driving distance with enable conditions = true	Type B
			(Maximum minus minimum measured filtered value of urea tank level direct piezo sensor	< 0.1 mm				
			for accumulated distance traveled with enable conditions	>= 3.5 km	Measured value of urea tank level direct piezo sensor)	<= 143 mm		
					OR			
					(Estimated amount of liquid urea remaining in urea tank	>= 4l		
					Measured value of urea tank level direct piezo sensor))	< 143 mm		
					Vehicle speed	>=7km/h		
					Vehicle acceleration	>= 0.4 m/sec^2		
					Basic enable conditions met for FID_ERR_RTL_SENS_STUCK_DIAG[0]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RTL_SENS_STUCK_DIAG[0]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Status enable pattern from stationary level validity field for activation of distance interval accumulation for the stuck level diagnosis	1000 0000 Bit7 = true (See SummTable Bit-Definitions for LF_RTL_MES_VLD_DET_STAT_CDN[0])		
					Bit-mask to release the validity of urea tank level information (*)	0000 0000 1011 1000 Bit3 = true Bit4 = true Bit5 = true Bit7 = true (See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det)		
Reductant Level Sensor 2 Stuck	P21C6	This diagnostic checks if the combi (tube height) level measurement is stuck, by looking for a minimum change in the level of the tube measurement of the transducer (TD1) signal over a prescribed driven distance that includes some minimum levels of vehicle acceleration. The diagnostic reports a failure if the minimum signal change is not seen.	Test: RTL_SENS_STUCK_DIAG_1		)Measured value of urea tank level combi piezo sensor	>= 17 mm	100 ms after minimum driving distance with enable conditions = true	Type B
			(Maximum minus minimum measured filtered value of urea tank level combi piezo sensor	< 0.1 mm	Measured value of urea tank level combi piezo sensor)	<= 56.15 mm		
			for accumulated distance traveled with enable conditions	>= 3.5 km	OR			
					(Estimated amount of liquid urea remaining in urea tank	>= 4l		
					Measured value of urea tank level combi piezo sensor))	< 56.15 mm		
					Vehicle speed	>=7km/h		
					Vehicle acceleration	>= 0.4 m/sec^2		
					Basic enable conditions met for FID_ERR_RTL_SENS_STUCK_DIAG[1]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RTL_SENS_STUCK_DIAG[1]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Status enable pattern from stationary level validity field for activation of distance interval accumulation for the stuck level diagnosis	1000 0000 Bit7 = true (See SummTable Bit-Definitions for LF_RTL_MES_VLD_DET_STAT_CDN[1])		
					Bit-mask to release the validity of urea tank level information (*)	0010 1100 0000 1000 Bit3 = true Bit10 = true Bit11 = true Bit13 = true (See SummTable Bit-Definitions for lf_rtl_sens_mes_vld_det)		
Reductant Control Module Supply Voltage Low Voltage	P21CB	Reductant control module supply voltage too low relative to system voltage	Test: VP_PWR_PLAUS_L_0		Basic enable conditions met for FID_ERR_VP_PWR_PLAUS_L[0]	= see Auxiliary Enable Conditions Flags in FARM_SumTab	2 s	Type A
			System voltage measured by ECM - Battery voltage measured by reductant control module	> 4V	No pending or confirmed DTC's for FID_ERR_VP_PWR_PLAUS_L[0]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Time delay to inhibit the diagnosis of the plausibility measured voltage	=0		
Reductant Tank Heater 1 Low Current	P21DD	This diagnostic detects if the reductant tank heater current is too low (below a threshold).	Test: VP_CFB_RAG_HEAT_L_0	< 0.5000 V (< 2.9A)	(Commanded reductant tank heater duty cycle	>= 1.001 %	1 s	Type A
					for number of events	>= 10 (100 ms)		
					Note: An event counter corresponds to 10 ms			
					Basic enable conditions met for FID_ERR_VP_CFB_RAG_HEAT_ORNG[0]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_VP_CFB_RAG_HEAT_ORNG[0]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Tank Heater 2 Low Current	P221C	This diagnostic detects if the reductant line heater current is too low (below a threshold).	Test: VP_CFB_RAG_HEAT_L_1	< 0.5000 V (< 2.9A)	(Commanded reductant line heater duty cycle	>= 1.001 %	1 s	Type A
					for number of events	>= 10 (100 ms)		
					Note: An event counter corresponds to 10 ms			
					Basic enable conditions met for FID_ERR_VP_CFB_RAG_HEAT_ORNG[1]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_VP_CFB_RAG_HEAT_ORNG[1]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Tank Heater 2 High Current	P221D	This diagnostic detects if the reductant line heater current is too high (exceeds a threshold).	Test: VP_CFB_RAG_HEAT_H_1		(Commanded reductant line heater duty cycle	>= 1.001 %	1 s	Type A
					for number of events	>= 10 (100 ms)		
					Basic enable conditions met for FID_ERR_VP_CFB_RAG_HEAT_ORNG[1]	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_VP_CFB_RAG_HEAT_ORNG[1]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Basic enable conditions met for FID_ERR_RAG_HEAT_DIAG	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_RAG_HEAT_DIAG	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Excessive Time To Enter Closed Loop Reductant Injection Control	P249C	The Reductant Control Module determines that the time to achieve closed loop reductant pressure control is too long after startup (line fill), during the intitial pressure build.	Test: RAG_T_CLL		Deicing process of the reducing agent in the system is completed	= true (See SummTable Bit-Definitions for LV_RAG_WUP_HEAT_CMPL)	90 sec after secondary parameters are fulfilled recurrence: 100ms c_abc_ini_typ_RAG_T_CLL = 0	Type A
			Reducing agent filling and air check functionality completed	= false (see SummTable Bit-Definitions for lv_rag_fill_air_chk_cmpl)	Pressure control activation request received from ECM	= true		
					Basic enable conditions met for FID_ERR_RAG_T_CLL	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
			AND					
					No pending or confirmed DTC's for FID_ERR_RAG_T_CLL	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Diagnosis timer for the reducing agent system readiness diagnosis	>= 90 sec	Delay time to wait for CAN signals	>= 5 sec		
					Engine running	= true		
					Low reductant tank level detected	= false (See SummTable Bit-Definitions for LV_RTL_MIN_DET)		
Reductant Pump Motor Position Sensor Performance	P2AD7	The reductant pump uses 3 hall sensors to calculate pump speed and as input to the brushless DC (BLDC) pump motor control. This diagnostic checks that the correct hall sensor pattern and no sequence error is measured when the pump is being commanded to turn. An incorrect pattern/sequence will result in a diagnostic failure.	Test: EM_RAG_SENS		Battery voltage - filtered value	> 0 V	300 ms	Type A
			Hall pattern	= 000				
			OR					
			Hall pattern	= 111	Absolute value of the demanded urea supply pump torque	>= 0.02 Nm		
			OR		Relative speed set point for urea supply pump motor control	> 0.122 %		
			(Incorrect hall sensor sequence error counter	>= 1				
			for time)	>= 0.080000 sec				
			OR					
			Continuous hall sensor sequence error counter	>=1	Speed controller active	=true (See SummTable Bit-Definitions for LV_RAG_PID_CTL_ENA)		
					Basic enable conditions met for FID_ERR_EM_RAG_SENS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_EM_RAG_SENS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
Reductant Tank Temperature Sensor B Circuit Range/Performance	P2ADA	Reductant tank temperature is compared to the reductant temperature sensor, and the Average Engine Startup Reference Temperature received from the ECM after a sufficient period with the engine off (e.g. 8 hrs). A fault is detected if the difference in temperatures exceeds a threshold	Test 1: CST_TEMP_RAG_TANK_H		(Ignition on	= true	10 s	Type A
			Urea tank temperature stored at engine start minus urea pressure sensor temperature stored at engine start	> 30.0375 DegC				
			AND					
			Urea tank temperature stored at engine start minus Average Engine Stratup Reference Temperature from ECM	> 30.0375 DegC	for time)	>= 8,5 sec		
					Basic enable conditions met for FID_ERR_CRCH_RAG_TEMP_HLD	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_CRCH_RAG_TEMP_HLD	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Basic enable conditions met for FID_ERR_CRCH_TEMP_RASL	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_CRCH_TEMP_RASL	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Engine off time	>= 28800 sec		
					Measured ambient air temperature	>= -40 DegC		
					(Urea tank refill detected (*)	= false		
					for time)	>= 43200 sec		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Test 2: CST_TEMP_RAG_TANK_L					
			Urea tank temperature stored at engine start minus urea pressure sensor temperature stored at engine start	< -30.025 DegC				
			AND Urea tank temperature stored at engine start minus Average Engine Stratup Reference Temperature from ECM	< -30.0375 DegC				
Reductant Tank Temperature Sensor B Circuit High	P2ADC	The level sensor detects an electrical fault (OC, or SC) with the reductant tank temperature sensor. The sensor output for reductant tank temperature is set to $0FFA. Internally, the sensor will use a default temperature of 20degC for the computation of levels and urea concentration.	Test: UCLS_NOT_VLD_2		Basic enable conditions met for FID_ERR_UCLS_NOT_VLD	= see Auxiliary Enable Conditions Flags in FARM_SumTab	9 s	Type A
			Urea tank data error state received: Bit 2 OR	= true				
			Urea tank data error state received: Bit 3	= true				
					No pending or confirmed DTC's for FID_ERR_UCLS_NOT_VLD	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			for every new measurement cycle via SENT	= 0.5 sec	initial delay time of condition	>= 600 ms		
Reductant Tank Temperature Sensor B Circuit Intermittent/Erratic	P2ADD	The Reductant Control Module determines that the LQTS tank temperature measurement changes too quickly	Test: TEMP_GRD_RASL _1		Basic enable conditions met for FID_ERR_TEMP_GRD_RASL[1]	= see Auxiliary Enable Conditions Flags in FARM_SumTab	7.2 s	Type A
			gradient of reductant tank temperature signal	>= 1.6 deg C/sec				
					No pending or confirmed DTC's for FID_ERR_TEMP_GRD_RASL[1]	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Time delay for steady conditions	>= 5 sec		
Reductant Quality Sensor Circuit Erratic	P2B9A	This diagnostic performs 2 testss. The first test checks if the urea concentration changes too quickly within a driving cycle, without a refill being detected. The second test checks if the urea concentration at the start of the current driving cycle is different than the urea concentration at the end of the previous driving cycle when no refill has occurred.	Test 1: CONC_RAG_CHG_DYN		Vehicle speed	>30km/h	100 ms	Type A
			Maximum measured change in urea concentration during a driving cycle	>= 9 to 36.5% depending on level (See Figure 27 in SummTable CURVES - MAPS)				
					Basic enable conditions met for FID_ERR_CONC_RAG_CHG_DYN	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_CONC_RAG_CHG_DYN	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					Tank refill check was possible and no refill detected	=1 (See SummTable Bit - Definitions for LV_RAG_TANK_DET_NOT_FILL)		
					Distance travelled threshold to start the waiting timer for condition of diagnosis	>=0,5km		
					Waiting time for setting condition for concentration of reducing agent changing fast during vehicle run diagnosis	>=10s		
					Time since the dynamic concentration measurement is valid	>= 30 s		
			Test 2: CONC_RAG_CHG_ST		Time since the concentration measurement is valid	>=30s		
			Absolute value of urea concentration stored from previous driving cycle - urea concentration measured on the current driving cycle	>= 9 to 36.5% depending on level (See Figure 28 in SummTable CURVES - MAPS)				
			AND		Basic enable conditions met for FID_ERR_CONC_RAG_CHG_ST	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_CONC_RAG_CHG_ST	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Current measured urea concentration OR Current measured urea concentration	< 26 % OR > 39 %	Tank refill check was possible and no refill detected	=1 (See SummTable Bit - Definitions for LV_RAG_TANK_DET_NOT_FILL)		
Reductant Control Module Powertrain Sensor Bus Off	U2412	This diagnostic detects when the sensor bus CAN communications are off	Test: CAN_BOFF		Sensor bus on	=true	215 ms	Type A
			Missed message counter	>= 22				
					AND			
					Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					AND			
					(Battery voltage - filtered value	> 0 V		
					Battery voltage - filtered value)	< 640 V		
					AND			
					for time]	>= 1 sec		
Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	U2626	Signal supervision timeout on all messages being received from ECM on the Sensor Bus	Test 1: COM_SCAN_GENERAL_DIAGNOSTIC_TOUT		Sensor bus on	=true	250 ms to 2500 ms depending on individual message transmit rate	Type A
			General Diagnostic message not received	= true				
					AND			
					Basic enable conditions met for FID_ERR_COM_DIAG_PLAUS	= see Auxiliary Enable Conditions Flags in FARM_SumTab		
					No pending or confirmed DTC's for FID_ERR_COM_DIAG_PLAUS	= see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
					AND			
					Delay counter for activating CAN diagnosis	>= 1 sec		
			Test 2:					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			COM_SCAN_DEFC_SERVICE_DEVICE_TOUT Service Device message not received Test 3: COM_SCAN_DEFC_INFORMATION_3_TOUT DEFC Information 3 message not received Test 4 COM_SCAN_DEFC_INFORMATION_4_TOUT DEFC Information 4 message not received	= true = true = true				
Reductant Control Module Lost Communication with Reductant Level Sensor Reductant Control Module Lost Communication with Reductant Concentration Sensor Reductant Control Module Lost Communication with Reductant Tank Temperature Sensor 2	U2627 U2628 U2630	The reductant control module diagnoses message(s) on the SENT communications line with the Level-Quality-Temperature Sensor (LQTS) by performing 5 tests: 1. Invalid message structure 2. Invalid checksum 3. SENT message high 4. SENT message low 5. Multiplex frame error	Test 1: COM_SENS_SENT_UREA_TANK (Calibration pulse length OR Calibration pulse length) OR Number of falling edges between calibration pulses OR Data pulse length OR Data pulse length OR Absolute value of difference between consecutive calibration pulse lengths OR (Number of received message OR Number of received message) within time Note: The nominal duration of the clock tick of the urea tank sensor module is 90 µs. A fault is detected if the calibration pulse length is below 3780 us or above 6300 us.	> 56 nominal clock ticks + 25 % < 56 nominal clock ticks - 25 % not equal 8 < 12 clock ticks > 27 clock ticks > 1.5625 % > 1 = 0 = 0.03 sec	Sensor Bus wake up AND Delay time AND Basic enable conditions met for FID_ERR_DIAG_COM_SENS_SENT_UREA_TANK No pending or confirmed DTC's for FID_ERR_DIAG_COM_SENS_SENT_UREA_TANK	=true >= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	Test 1: 1000 ms Test 2: 1200 ms Test 3: 630 ms Test 4: 1100 ms Test 5: 8000 ms	Type A
			Test 2: DATA_CHK_SENS_SENT_UREA_TANK Checksum error	= true	Sensor Bus wake up AND Delay time AND Basic enable conditions met for FID_ERR_DIAG_CHK_SENS_SENT_UREA_TANK No pending or confirmed DTC's for FID_ERR_DIAG_CHK_SENS_SENT_UREA_TANK	=true >= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 3: DATA_SIG_SENS_SENT_1_UREA_TANK Data received on fast channel)	> 65530	Sensor Bus wake up AND Delay time AND Basic enable conditions met for FID_ERR_DIAG_SIG_SENS_SENT_1_UREA_TANK No pending or confirmed DTC's for FID_ERR_DIAG_SIG_SENS_SENT_1_UREA_TANK	=true >= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 4: INI_SENS_SENT_UREA_TANK Data received on fast channel	= 0	Sensor Bus wake up AND Delay time AND Basic enable conditions met for FID_ERR_DIAG_INI_SENS_SENT_UREA_TANK No pending or confirmed DTC's for FID_ERR_DIAG_INI_SENS_SENT_UREA_TANK	=true >= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 5: MUX_ORNG_SENS_SENT_UREA_TANK Error flag that indicates within a complete transmission cycle of 15 multiplexed frames, there is at least one frame with out of range error. (14 in range, 1 out of range)	=1	Delay time AND Basic enable conditions met for FID_ERR_MUX_ORNG_SENS_SENT_UREA_TANK No pending or confirmed DTC's for FID_ERR_MUX_ORNG_SENS_SENT_UREA_TANK AND Enable fault detection AND Complete cycle of 15 multiplexed frames was completed	>= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = 1 =1		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Reductant Control Module Lost Communication with Reductant Pressure Sensor	U2631	The reductant control module has detected message faults on the SENT communications line with the Pressure-Temperature Sensor (PTS). This diagnostic consists of 7 tests: Test 1: Invalid message structure on fast channel Test 2: Slow channel transmission errors Test 3: Checksum error on fast channel data Test 4: Checksum error on slow channel data Test 5: Fast channel data high Test 6: Slow channel data out of range Test 7 Fast channel data low	Test 1: COM_SENS_SENT_UREA_PRS (Calibration pulse length OR Calibration pulse length) OR Number of falling edges between calibration pulses OR Data pulse length OR Data pulse length OR Absolute value of difference between consecutive calibration pulse lengths OR (Number of received messages OR Number of received messages) within time Note: The nominal duration of the clock tick of the urea pressure sensor is 30 µs. A fault is detected if the calibration pulse length is below 1260 µs or above 2100 µs.	 > 56 nominal clock ticks + 25 % < 56 nominal clock ticks - 25 % not equal 9 < 12 clock ticks > 27 clock ticks > 1.5625 % > 2 = 0 = 0.01 sec	Delay time AND Basic enable conditions met for FID_ERR_DIAG_COM_SENS_SENT_UREA_PRS No pending or confirmed DTC's for FID_ERR_DIAG_COM_SENS_SENT_UREA_PRS	>= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab	Test 1: 1000 ms Test 2: 1200 ms Test 3: 1200 ms Test 4: 4300 ms Test 5: 1250 ms Test 6: 8400 ms Test 7: 1100 ms	Type A
Reductant Control Module Lost Communication with Reductant Tank Temperature Sensor 1	U2629		Test 2: COM_SRL_SENS_SENT_UREA_PRS CRC error not provided by the driver of SENT for serial message AND Time frame for the expected number of slow frames AND (Minimum number of valid frames received between defined time frame OR Maximum number of valid frames received between defined time frame)	 =0 >=100 <= 4 >9	Delay time AND Basic enable conditions met for FID_ERR_COM_SRL_SENS_SENT_UREA_PRS No pending or confirmed DTC's for FID_ERR_COM_SRL_SENS_SENT_UREA_PRS AND Enable fault detection	>= 5 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab =1		
			Test 3: DATA_CHK_SENS_SENT_UREA_PRS Checksum error OR ((Number of received messages (Number of increments of message counter OR Number of increments of message counter OR Inverted copy error)) within time) Note: Inverted copy error: this diagnostics checks that nibble 6 is an inverted copy of nibble 1 as defined in SAE J2716	 = true > 0 > 2 = 0 = true = 0.01 sec	Delay time AND Basic enable conditions met for FID_ERR_DIAG_CHK_SENS_SENT_UREA_PRS No pending or confirmed DTC's for FID_ERR_DIAG_CHK_SENS_SENT_UREA_PRS	>= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 4: DATA_CHK_SRL_SENS_SENT_UREA_PRS CRC error provided by the driver of SENT for serial message	 =1	Delay time AND Basic enable conditions met for FID_ERR_CKS_SRL_SENS_SENT_UREA_PRS No pending or confirmed DTC's for FID_ERR_CKS_SRL_SENS_SENT_UREA_PRS AND Enable fault detection AND Serial message available on the sensor	>= 5 sec = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab =1 =1		
			Test 5: DATA_SIG_SENS_SENT_1_UREA_PRS Data received on fast channel	 > 4088	Delay time	>= 2s		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					AND Basic enable conditions met for FID_ERR_DIAG_SIG_SENS_SENT_1_UREA_PRS No pending or confirmed DTC's for FID_ERR_DIAG_SIG_SENS_SENT_1_UREA_PRS	 = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		
			Test 6: DATA_SIG_SRL_SENS_SENT_UREA_PRS Channel data on SERIAL frames below minimum diagnosis threshold Channel data on SERIAL frames above maximum diagnosis threshold	 < 0 > 4095	Delay time AND Basic enable conditions met for FID_ERR_DATA_SRL_SENS_SENT_UREA_PRS No pending or confirmed DTC's for FID_ERR_DATA_SRL_SENS_SENT_UREA_PRS AND Enable fault detection AND Identifier of serial message from SENT sensor	>= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab = 1 = 35		
			Test 7: INI_SENS_SENT_UREA_PRS Data received on fast channel Raw status and communication nibble information) Slow channel error Note: Slow channel error = 3 corresponds to urea pressure sensor initialization error	 = 0 = 0 = 3	Delay time AND Basic enable conditions met for FID_ERR_DIAG_INI_SENS_SENT_UREA_PRS No pending or confirmed DTC's for FID_ERR_DIAG_INI_SENS_SENT_UREA_PRS	>= 2s = see Auxiliary Enable Conditions Flags in FARM_SumTab = see Inhibiting Diagnostic Tests and Associated DTC's in FARM_SumTab		