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.
Turbocharger VGT A Position Exceeded Learning Limit (VGT Smart)	P003A	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at key off during the learning procedure is plausibile	physical travel measured at key off < low threshold OR physical travel measured at key off > high threshold	< 195.00 [counts] OR > 308.00 [counts]	Test enabled by calibration Key signal is off Learning procedure at key off has been successfully completed: - ambient temperature greater than a threshold; - engine coolant temperature in range; - battery voltage in range; -learning time needed smaller than a time out threshold; - no faults present on coolant temperature sensor; - no faults present on ambient temperature sensor. End Of Trip event has elapsed No fault validated on smart VGT rolling counters	== 1.00 >= -60.00 (°C) <= 129.00 (°C) >= 10.00 (°C) <= 30.00 (V) >= 9.00 (V) <= 3.00 (s) ECT_Sensor_FA ==FALSE OAT_PtEstFiltFA ==FALSE CFM_VGT_CommFA ==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.
Turbocharger VGT A Performance (VGT Smart)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	> 16.00 [%]	Test enabled by calibration	== 1.00	320.00 fail count out of 400.00 sample counts Function task: 25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	VGT_PstnSnsrOfstFA ==FALSE VGT_SmartActrFA ==FALSE CFM_VGT_CommFA ==FALSE		
					VGT position setpoint in steady state conditions for minimum time	< 100.00 [%/s] > -100.00 [%/s] for 0.50 [s]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>= 0.00 [°C]		
					No faults present on engine coolant			

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

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	> 15.0 deg C	Time between current ignition cycle and the last time the engine was running	>= 28,800.0 seconds	Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips
			If IAT < OAT: OAT - IAT	> 15.0 deg C	Engine is not running			
					Vehicle Speed	>= 12.4 MPH		
			If either of the following conditions are met, this diagnostic will pass:		Coolant Temperature - IAT	< 15.0 deg C		
					IAT - Coolant Temperature	< 15.0 deg C		
			If IAT >= OAT: IAT - OAT	<= 15.0 deg C	OAT-to-IAT engine off equilibrium counter	>= 300.0 counts		
			If IAT < OAT: OAT - IAT	<= 15.0 deg C	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:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	<= 46 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	>= 427,757 Ohms (~-60 deg C)	Continuous		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.
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.
Charge Air Cooler Temperature Sensor Up Circuit Performance	P007B	This monitor checks if the CAC up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	> 20.00 [°C]	Test enabled by calibration	== 1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>= 1.00 [s]		
					Runk Crank Relay voltage in range	> 11.00 [V]		
					The engine has not run for a calibratable time since last key off	>= 28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	< 45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler up air temperature sensors	CIT_CAC_UpCktFA ==FALSE CIT_CAC_UpSelfCorFA ==FALSE		
					No faults detected on intake manifold air temperature sensor	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	< 7.11 [ohm]	Test enabled by calibration	== 1.00	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips
					Engine not cranking			
					Runk Crank Relay voltage in range	> 11.00 [V]		

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	> 753,016.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	20.00 fail counter over 24.00 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] < -40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_UpCktFA ==FALSE	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.
Fuel Rail Pressure (FRP) Too Low	P0087	Determine if rail pressure is below an absolute value.	Rail pressure	< 0 to 13 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 >= 350.00 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: Powertrain relay voltage Run crank voltage Engine not cranking Metering Unit valve calibrated as present	≥ 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 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 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	**<u>Good Correlation Between IAT and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	 > 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
			<u>Not Good Correlation, IAT in Middle</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	 > 25 deg C	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	
			<u>Not Good Correlation, IAT3 in Middle</u> 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	< 13 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)	> 80.00 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.
Turbocharger VGT A Module Performance (VGT Smart)	P00AF	This monitor checks if the smart VGT has an internal fault	Smart actuator internal fault: Pattern Error, Overcurrent Error, Checksum Error (error information provided by the actuator)		Test enabled by calibration	== 1.00	8.00 fail counts out of 10.00 sample counts Function task: 500 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No fault validated on smart VGT rolling counters	CFM_VGT_CommFA ==FALSE		
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 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	> 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure TCIAP Pressure TCIAP Pressure No Active DTCs: No Pending DTCs:	> 5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimerError MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	384 fail counters over 480 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	 <= 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 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 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	< 57.94 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	> 153,665 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)	> 80.00 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.
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_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	 > 1.25 [ratio] < 0.75 [ratio]	Calibration on diagnostic enabling PT relay supply voltage in range 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 > -20.00 [°C] OAT_PtEstFiltFA==TRUE > -20.00 [°C] OAT_OAT_SnsrNonEmissFA ==FALSE	Test is evaluated after the enabling conditions are satisfied for a number of samples == 800.00 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	> -20.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 40.00 [°C] ==TRUE < 130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					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	<= 0.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR (if present) valve position	<= 1.00 [%]		
					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	> 1.25 [ratio]	Intrusive Test enabled by calibration	0.00 ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	
			Drift low check: drift of the mass air flow	< 0.75 [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.		Diagnostic has not run in current driving cycle yet	==TRUE	== 800.00	
			If, by calibration, CeMAFD_e_ArflAdj		Calibratable SCR dosing condition	IF 0.00 ==TRUE: SCR dosing condition is NH3 storage control OR intrusive NH3 storage control OR transient dosing control.	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.
			==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	> 0.60 [ratio]		
					Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	< 3.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					Desired fuel in range, with hysteresis OR (Speed Control Mode is Idle AND No faults detected on Speed Control) (OBDII market only)	Enabled if < 0.00 [mm^3] AND > 0.00 [mm^3] Disabled if > 0.00 [mm^3] OR < 0.00 [mm^3] ==TRUE FUL_IFM_IdleFuelQntyFA ==FALSE		
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side driver closed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_NotVld ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE		
					OBDII Market: Outside Ambient Temperature in range OR Fault present on Ouside Air temperature	> -20.00 [°C] OR OAT_PtEstFiltFA==TRUE		
					EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature	> -20.00 [°C] AND OAT_OAT_SnsrNonEmissFA ==FALSE		
					Induction air temperature	> -20.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR	> 40.00 [°C] ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OBD Coolant Enable Criteria), AND Engine Coolant Temperature	< 130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_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	<= 1.00 [%]		
					No faults detected on LP EGR (if present) valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine speed in range OR	> 560.00 [rpm] < 1,000.00 [rpm]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(Speed Control Mode is Idle AND No faults detected on Speed Control) (OBDII market only)	==TRUE IAC_SystemRPM_FA ==FALSE		
					for a time	>= 10.00 [s]		
					Intake manifold pressure in range	> 69.60 [kPa] < 130.00 [kPa]		
					Intake manifold pressure is in steady state (SS)	when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, |Intake manifold pressure - p_ref| < 3.00 [kPa] for 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	<= 0.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					All conditions are verified for a time	> 2.00 [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	< 260.00 [Hz]	Test enabled by calibration	1.00 ==TRUE	300.00 fail counts out of 375.00 sample counts	Type A, 1 Trips
					Engine speed	>= 590.00 [rpm]		
					PT relay supply voltage in range	> 11.00 [V]	Function task: 100 ms	
					Share High Side Driver closed	==TRUE		
					All conditions are valid for a time	>= 0.30 [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 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	> 14,400.00 [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 >= 590.00 [rpm] > 11.00 [V] ==TRUE >= 0.30 [s]	300.00 fail counts out of 375.00 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.
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] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE 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] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	384 fail counters over 480 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	> 90.0 % of 5 Volt Range (This is equal to 390.0 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	< 58.00 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	> 142,438 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 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)	> 175,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -20.0 °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 11 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 71 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 11 °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 20 ≤ Eng Run Tme ≤ 1,450 seconds Ethanol ≤ 15 % ≥ 0.93 miles *************************** 9,999 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 71 °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 ≤ 52 °C		

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_Fuel Min**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.40 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 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_Fuel Max**)[mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.40 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 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 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 IF fuel fired heater has been used ELSE (see **P0181 Fuel Temperature Sensor Reference**)	>= 20.00 °C >= 20.00 °C	FTZM Run crank voltage 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	≥ 8.0 > 6 s < 7.00 s > 28,800 s > -40 °C = TRUE FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	3 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 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 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 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 At least one valid value received from serial communication 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 At least one valid value received from serial communication 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 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_DiagEnb ld] b) Timer Engine Running [FDBR_t_EngModeRunC oarse] 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_U codeCmFA 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** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	= CeFHPG_e_RPS_DoubleTrack ≥ 15 s > 8.4 V	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.
					No active DTC:	FHP_RPS_CktFA FHP_RPS2_CktFA P0194		

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.
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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 95.00 [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 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
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) == == == == Engine coolant temperature **************************** Type cal above = 1 (Electrically heated t-stat) == == == == Engine coolant temperature	≤ 70.0 Deg C ≤ 78.5 Deg C	No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature ************************* Engine coolant temperature At least once during the key cycle Type 0 (non-heated t-stat) Type 1 (Electrically heated T-stat) ************************* Heat to coolant DFCO time Thermostat duty cycle RPM Active Fuel Management is not in	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA ≥ 30.0 seconds ≥ 1.2 km ≥ 55.0 kPa ≥ -9.0 Deg C ≥ 71 Deg C ≥ 79.5 to 94.5 Deg C **Cool Down Diagnostic** ≥ **Min Heat to Coolant** ≤ 5.0 seconds ≤ 20.0 % ≤ 8,192 Half Cylinder Mode	30 seconds out of a 60 seconds window Continuous	Type B, 2 Trips

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 (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 0.00 [us] OR > 105.00 [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); -	38 failures out of 55 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 (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 0.00 [us] OR > 105.00 [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); -	38 failures out of 55 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 (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 0.00 [us] OR > 105.00 [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); -	38 failures out of 55 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 (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 4 provided by HWIO	< 0.00 [us] OR > 105.00 [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); -	38 failures out of 55 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 (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 0.00 [us] OR > 105.00 [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); -	38 failures out of 55 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 (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 0.00 [us] OR > 105.00 [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); -	38 failures out of 55 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|
			}
			OR
			information of dropped pulse reported by HWIO
			Cumulative injection pulse width calculated by
				> **P0216_PulsWidthErrHi** [us] depending on the number of injection pulses active
				> 80.00 [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
						== 1.00 [Boolean]
						> 11.00 [V]
						-
						FUL_InjCktTFTKO
						FUL_CntrlrStTFTKO
						FUL_BoostVoltTFTKO
						FUL_PullInErrTFTKO
						== TRUE);
							8 failures out of 128 samples
							or
							28 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.
			Application SW is equal to the sum of the programmed pulses width and the end of injection period measurement 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 (20.00 [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 > 105.00 [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); -	38 failures out of 55 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 (20.00 [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 > 105.00 [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); -	38 failures out of 55 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.
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 > -20.00 [°C] AND < 55.00 [°C] > -5 [kPa/s] AND < 4 [kPa/s]	400 fail counters over 500 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	> 1,300.00 [rpm] AND < 2,200.00 [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	> 70 [°C] ==TRUE < 130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND < 110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	AIC_BstSysDiagDenomDsbl ==FALSE		
					All enabling conditions last for a time	> **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.
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.
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.
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.
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 1.00 ==TRUE, it is the induction air temperature, otherwise it is the outside air temperature.	< 28.84 [%]	Calibration on diagnostic enabling	1.00 ==TRUE	Test executed after 200.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips
					Diagnostic has not run in current driving cycle yet	==TRUE		
					Vehicle speed in range	> 92.00 [kph]		
					Air mass flow in range	> 90.00 [mg/s] < 500.00 [mg/s]		
					Engine coolant temperature in range OR OBD Coolant Enable Criteria	> 70.00 [°C] ==TRUE		
					Throttle valve position	> 85.00 [%]		
					Pressure ratio through the compressor in range	> 1.23 [ratio]		
					Temperature difference between upstream charge air cooler and Reference temperature in range	> 33.00 [°C]		
					Environmental pressure in range	> 69.60 [kPa]		
					Environmental temperature in range	> -20.00 [°C]		

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	>= 11.00 [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 OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.50 + 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] > 74.00 [kPa] 0 [boolean] = TRUE > 70.00 [°C] > -20.00 [°C]	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.
					for a time (only in case of Automatic Transmission)	different from Neutral or Parking > 1.00 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,600 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 20 [mm^3] < 45 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 1.00 [s]		
					m. Vehicle speed in operating range for a time	> 20 [kph] < 125 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_** (**CombModeGrp**)		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq		

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

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 OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.50 + 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] > 74.00 [kPa] 0 [boolean] = TRUE > 70.00 [°C] > -20.00 [°C] different from Neutral or	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time (only in case of Automatic Transmission)	Parking > 1.00 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 40 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 1.00 [s]		
					m. Vehicle speed in operating range for a time	> 20 [kph] < 125 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_** (**CombModeGrp**)		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq		

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

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.
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.
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.
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.
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.
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 > -20.00 [°C] AND < 55.00 [°C] > -5 [kPa/s] AND < 4 [kPa/s]	400.00 fail counters over 500.00 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	> 1,250.00 [rpm] AND < 2,000.00 [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	> 70 [°C] ==TRUE < 130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND < 110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 cointaining 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	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from wide open (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 16.00 [%]	Test enabled by calibration	== 1.00	1,280.00 fail counts out of 1,600.00 sample counts 1,280.00 fail counts to enable the open circuit check (P02E0) Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>= 70.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Throttle position setpoint in steady state conditions for minimum time	> -160.00 [%/s] < 160.00 [%/s] for >= 0.40 [s]		
					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	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	< 75.00 [%]	P02E1 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	 > 1.00 [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	< 1.00 [%5V]	Test enabled by calibration	== 1.00	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No faults present on Throttle SENT out of range and SENT performance	TPS_SENT_OOR_Flt == FALSE TPS_SENT_PerfFlt == FALSE		

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	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range and SENT performance	== 1.00 > 11.00 [V] TPS_SENT_OOR_Flt== FALSE TPS_SENT_PerfFlt== FALSE	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.
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	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No faults present on Throttle DC Motor current range/performance	TPS_MtrCurrLimTFTKO == FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab > **RufSCD_Decel** AND > **RufSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **RufCyl_Decel** AND > **RufCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -9 ºC < ECT Or if OBD Max Coolant Achieved = TRUE -9 ºC < ECT < 131 ºC < -9 ºC If OBD Max Coolant Achieved = FALSE 21 ºC < ECT If OBD Max Coolant Achieved = TRUE 21 ºC < ECT < 131 ºC 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (4) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AFM: SINGLE CYLINDER CONTINUOUS MISFIRE (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk) OR (CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk) AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk) (CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk)	> **CylModeDecel** * **ClyAfterAFM_Decel** > **CylModeJerk** * **CylAfterAFM_Jerk** > **CylModeDecel** * **CylBeforeAFM_Decel** > **CylModeJerk** * **ClyBeforeAFM_Jerk** > 3 Engine Cycles > **CylModeDecel** * **ClyAfterAFM_Decel** * **RandomAFM_Decl** > **CylModeJerk** * **CylAfterAFM_Jerk** * **RandomAFM_Jerk** > **CylModeDecel** * **CylBeforeAFM_Decel** * **RandomAFM_Decl** > **CylModeJerk** * **ClyBeforeAFM_Jerk** * **RandomAFM_Jerk** - see details on Supporting Tables Tab				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Misfire Percent Emission Failure Threshold	≥ 3.88 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 8,191 rpm AND > 199 % load AND < 180 counts on one cylinder		
					Engine Speed	450 < rpm < ((Engine Over Speed Limit) - 250) OR 3,200) Engine speed limit is a function of inputs like Gear and temperature	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						see **EngineOverSpeedLimit** in supporting tables		
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine	***Undetectable region***	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					speed and engine load region	from Malfunction Criteria		
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** or <**ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	≤ 100.0 % (≤ 100.0 % in AFM) > 318 mph (> 318 mph AFM)	4 cycle delay	
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	<**DeacCylInversionDecel** <**DeacCylInversionJerk** > 4 cylinders	0 cycle delay	
					EGR Intrusive test	if Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 97.00 %	4 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Delay if PTO engaged	Enabled	4 cycle delay	
					*******************************		*******************	
					This Feature only used on Diesel engines	*******************************		
					Combustion Mode	= **InfrequentRegen** value in Supporting Tables	4 cycle delay	
					Driver cranks before Wait to Start lamp extinguishes	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque *******************************	> 199.99 % Max Torque *******************************	4 cycle delay *******************	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring:	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	> "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed Auto Transmission indivdual candidate deemed abnormal if number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles. abnormal candidates/ total candidates MISFIRE CRANKSHAFT	> 199 % > 1,000 rpm > 3 mph not shifting > **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables > 0.50 ratio	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:	Enabled		
					Pattern Recog Enabled during Cylinder Deac	Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Enabled		
					Engine Speed	580 < rpm < 6,800		
					Veh Speed	> 0.0 mph		
					The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk)	> Misfire_ decel ***** **1st_FireAftrMisfr_Acel** > Misfire_Jerk ***** **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	3 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk *****		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						SnapDecayAfterMisfire		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	> 0.60	discard 100 engine cycle test	
					*****************************		******************	
					NON-CRANKSHAFT BASED ROUGH ROAD:	*****************************		
					Rough Road Source	Disabled		
					*****************************		******************	
					IF Rough Road Source = WheelSpeedInECM	CeRRDR_e_None		
						*****************************		
					ABS/TCS Wheel speed noise VSES	active > **WSSRoughRoadThres** active	discard 100 engine cycle test	
					AND No Emission Neutral Default Action DTCs	ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status		
					*****************************		******************	
					IF Rough Road Source = "FromABS"	*****************************		
					ABS/TCS		discard 100	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					RoughRoad VSES AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "TOSS" TOSS dispersion AND No Active DTCs ****************************** Default Action Isolator Resonance Default Action Option ****************************** If Isolator Resonance Option Enabled AND Misfire P030x TFTKO	active detected active ABS Failed Vehicle Dynamics Control System Status ****************************** >**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedStat e_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only) ****************************** Not Enabled ****************************** Set engine speed limits: 0 < Eng RPM < 9,000	engine cycle test ******************* discard 100 engine cycle test 4 cycle delay ******************* *******************	

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 > 2.0 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:	>= 2.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 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 24 MEDRES events is OR (There are 24 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.
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	5.00 failures out of 8.00 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/ 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 (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 [%] <= 4 [rpm] > 20 [counts]	400.00 fail counters over 500.00 sample counters sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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|	<= 0.50 [mm^3]		
					for a minimum number of samples	> 16 [counts]		
					An air control transition has ended OR Such condition is disabled by calibration	Refer to "Air Control Transition"Free Form OR 1.00 ==TRUE		
					No active transition from a combustion mode to another one	==TRUE		
					Throttle measured position	> 85.00 [%]		
					Outside Air Temperature	> -20.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 70.00 [°C] ==TRUE		
					Desired EGR flow	> **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	> 7.00 [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	400.00 fail counters over 500.00 sample counters sampling time is 25 ms	
					Difficult launch NOT detected	Refer to "LDT_DifficultLaunchActive" Free Form		
					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])	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	1.00 ==TRUE		
				+	Engine Running	==TRUE		
				(LoBaro Constant x	Cranking ignition in range	Battery voltage > 11.00 [V]		
				P0401: Insufficient EGR flow barometric table B (low level) [mg])	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		
				(SeaBaro Constant x	Desired EGR rate	> 0 [%]		
				P0401: Insufficient EGR flow barometric table A (sea level)	Engine speed is steady state: |RPM-RPM_old|	<= 4 [rpm]		
				[mg] x **P0401: Insufficient EGR flow barometric**	for a minimum number of samples	> 20 [counts]		
				correction (sea level))	Fuel request is steady state: |FUEL-FUEL_old|	<= 0.50 [mm^3]		
				+ (MidBaro Constant	for a minimum number of samples	> 16 [counts]		
				x	An air control transition	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	> 85.00 [%]		
					Outside Air Temperature	> -20.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 70.00 [°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	> 0.00 [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	> 0.00 [s]		
					All enabling conditions (included the above timer) last for a time	> 7.00 [s]		

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	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully closed (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 16.00 [%]	Test enabled by calibration	== 1.00	1,260.00 fail counts out of 1,600.00 sample counts 1,260.00 fail counts to enable the open circuit check (P0403) Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>= 70.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	> -23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR position setpoint in steady state conditions for minimum time	> -160.00 [%/s] < 160.00 [%/s] for >= 0.04 [s]		
					HP EGR position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq== FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 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.
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	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 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.
EGR Temperature Sensor2 Ckt Range/ Performance	P040B	ECM determines that the EGR temperature Sensor 2 has not moved enought since start (Stuck)	ECM determines that after an allowed amount of amount of engine consumed following a long enough soak, the Down Stream Temperature sensor has not change enough.	ABS(Initial Down stream temperature - final down stream 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	cumulative Time > 11.00 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	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 159.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 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	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 885.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 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 absoluted 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 is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 30 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	ECM determines that the EGR temperature Sensor 1 has not moved enought since start (Stuck)	ECM determines that after an allowed amount of engine consumed airflow following a long enough soak, the Up Stream Temperature sensor has not change enough.	ABS(Initial upstream temperature - final upstream 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	cumulative Time > 4.00 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	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 164.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 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	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 860.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 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 absoluted 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 is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 30 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 = 0.00 [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 = 1.00 [Boolean] AND DPF_RegenMonitorSelected = NOT(0.00 [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 = 0.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [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 = 0.00 [Boolean])	Type B, 2 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 < 69.90 [KPa] OR Amb Temp < 253.00 [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 - 0.00 [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 = 0.00 [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 - 0.00 [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 > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 255.99 [°C] AND Cat Up Temp Snsr < 1,500.00 [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 > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat Up Temp Snsr > 0.00 [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 < 450.00 [g/s] AND 400.00 < Cat Up Temp Snsr [K] < 850.00 AND 0.01 < Post Inj Fuel Qnty [g/s] < 10.00 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 > 450.00 [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] < 0.01		

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] > 10.00 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 > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Main Catalyst Efficiency Below Threshold Bank 1	P0422	The Second Catalyst (UF DOC) monitor only runs during DPF regeneration and compares the UF DOC released oxidation heat and the exhaust-injected fuel quantity (by HCI) 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) Second Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Second Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that exhaust-injection (by HCI) is enabled during UF DOC monitor in order to produce enough exothermic heat across the Second Catalyst to evaluate the component conversion efficiency in a reliable way.	Second Catalyst Aging Index < Threshold If - Second Catalyst EWMA filter enabling calibration = TRUE AND - Second Catalyst conversion inefficiency previously detected (Second Catalyst Fault Active = TRUE) Then: Second Catalyst Aging Index < Repass Threshold	Aging Index < **Cat2_CrtdEffThrsh** [Curve] If EWMA Enbl Cal = 0.00 [Boolean] AND Second Catalyst FA = CAT_Cat2_SysEffLoB1_FA Then: Aging Index < **Cat2CrtdEffRepEWMA** [Curve]	- Second Catalyst monitor enabling calibration = TRUE AND No active DTCs: - Second Catalyst up temperature estimation not in fault (Fault Flag = FALSE) AND - Second Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; **Second Catalyst monitor status is DISABLED if:** - DPF regeneration disabled OR - HCI system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Second Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE)	Monitor Enbl Cal = 1.00 [Boolean] AND Cat2 Up Temp Estim Flt = NOT (EGT_TempCat2_UpFlt) AND Cat2 Dwn Temp Snsr Flt = NOT (EGT_SnsrCat2_DwnFlt); Samples nr. = 10.00 [Counter]; **Second Catalyst monitor status is DISABLED if:** DPF_DPF_St = SootLoading [Enumerative] OR HCI System Flt = HCI_GenericShtOffReq OR Amb Temp FA = CAT_OutsideTempFA OR Cat2 Up Exh Flow Flt = EXF_TotExhCat2_UpFlt	Task Time = 100 [ms] If - Second Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 0.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A) If - Second Catalyst EWMA filter enabling cailibration =	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Second Catalyst (UF DOC) monitor.			OR - Ambient conditions not always satisfied while engine running: Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; **Second Catalyst monitor status can move from DISABLED to TRIGGERED if:** - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND	OR - Ambient conditions not always satisfied while engine running: Amb Press < 69.90 [KPa] OR Amb Temp < 253.00 [K] OR Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean]; **Second Catalyst monitor status can move from DISABLED to TRIGGERED if:** DPF_DPF_St ≠ SootLoading [Enumerative] AND HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND	TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status =	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second 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 - Second Catalyst up exhaust temperature (by estimation) lower than calibration; **Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if:** - DPF regeneration	Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 255.99 [°C] AND Cat2 Up Temp Estim < 1,500.00 [K]; **Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if:** DPF_DPF_St ≠	EWMA Standard - 1 trip (with no mulfunction) to report pass - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second 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 - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Second Catalyst up exhaust temperature (by estimation) higher than calibration AND - Exhaust injection (by HCI) enabled AND - Second Catalyst up exhaust flow estimation	SootLoading [Enumerative] AND HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat2 Up Temp Estim > 675.00 [K] AND HCI_InjReleaseSt = TRUE [Boolean] AND Cat2 Up Exh Flow > 50.00 [g/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					higher than calibration AND - Exhaust injection fuel quantity (by HCI) higher than calibration; **Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if:** - Engine not running OR - Second Catalyst up exhaust flow estimation lower than calibration OR - Exhaust injection fuel quantity (by HCI) lower than calibration; **Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) 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 Second Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test**	AND Exh Inj Fuel Qnty (by HCI) > 0.00 [g]; **Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if:** - Engine not running OR Cat2 Up Exh Flow < 48.00 [g/s] OR Exh Inj Fuel Qnty (by HCI) < 0.00 [g]; **Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) 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 Second Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					evaluation trigger) if: - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second 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 - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Integrated exhaust injected fuel quantity (by HCI) higher than curve.	**evaluation trigger) if:** DPF_DPF_St ≠ SootLoading [Enumerative] AND HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Exh Inj Fuel Qnty (by HCI) > **Cat2_CrtdMaxFuel** [g].		

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	> 6.00 [%]	P0404 is already set		No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position)	> 2.00 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with dual fuel tanks and electric 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) ****************************** During Fuel Transfer ****************************** 2a) After expiration of fuel sloshing delay time, 2b) If minimum fuel transferred from the secondary tank is 2c) and if minimum fuel transferred into the primary tank is 2d) within time OR 3) ******************************	1a) == Disabled status 1b) ≥ 1,024.0 liters 1c) < 0.0 liters 1d) >= 18.0 liters 2a) >= 20.00 seconds 2b) > 5.00 liters 2c) < 2.50 liters 2d) <= 1,000.00 seconds	1a) Diagnostic Enabled 1b) Engine Operational State 3) Device control state for the electric transfer pump 4) Fuel Volume in Secondary Tank 5) Vehicle Speed	1a) == True 1b) == Running 3) <> True 4) < 141 liters 5) < 0 mph	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 consumed without a Primary Fuel Level Change **************************** 3a) If indicated fuel volume change is 3b) while fuel consumed by the engine is	3a) < 3 liters 3b) >= 19.8 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 82.00 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 7.20 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.
Cooling Fan 1 Relay Control Circuit Open (Output Driver Monitor) [Non- 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	50.00 failures out of 63.00 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.
Cooling Fan System Performance [Electro-Viscous Engine-Driven Fan Only]	P0483	Detects inability to control fan speed to desired RPM	Weighted filtered Cooling Fan Speed Differential [Measured - Commanded]	1. <= -520.00 RPM OR 2. >= 500.00 RPM	1. System Performance Test Triggered [FEAD_b_SysPerfTestTrig] 2. Commanded Cooling Fan Output Duty Cycle [FEAR_Pct_PWM_Output DutyCycle] 3a. Intake Air Temp Sensor Fault Active [DTCs P0112, P0113, P1111, P1112] 3b. Engine Coolant Temp Sensor FA [DTCs P0116, P0117, P0118, P0119, P1114, P1115] 3c. Cooling Fan Speed Sensor Circuit FA [DTC P0526] 3d. Cooling Fan FOD_OutputDriver_FA 3e. Ignition Sw Position Run_Crank Circuit voltage 3f. Induction Air Temp 4. System Performance Test enabled 5. Fan Speed Total Weighting Filtered Factor Calculation [See Supporting Calculation and Tables] P0483 Calculation - Total	1. == TRUE 2. >= 39.00 % 3a. <> TRUE 3b. <> TRUE 3c. <> TRUE 3d. <> TRUE 3e. >= 11.00 volts 3f. >= -20.00 degC 4. == TRUE 5. > 0.60 [dimensionless]	Fail condtion present >= 300.00 ; 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.
					Weighting Factor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Speed High [Electro-Viscous Engine-Driven Fan Only]	P0495	Diagnoses the engine-driven cooling fan speed during OFF state against a rational speed accounting for inertia and ram-air flow effects	Measured Cooling Fan Speed	> Calculated Allowed Fan Drag Speed RPM	a) Diagnostic enabled b) Hydraulic Fan Clutch Pumped Out [FEAD_b_ClutchPumpedOut] c) Calculated Cooling Fan Speed [FEAD_n_FanDriveSpeed]	a) == TRUE b) == TRUE c) > 1,600.00 RPM	800.00 failures / 1,000.00 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 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	< 15.00 [%5V] OR > 26.00 [%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 >= 70.00 [°C] <= 70.00 [°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.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00300	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (125 °C) Must verify KfECTI_T_EngCoolHotLoThresh (122) is less than KfECTI_T_EngCoolHotHiThresh (125)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 30 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 mph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 68.00 pct < 25.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqlntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnos tic Clutch Sensor FA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 5 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00300	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (125 °C) Must verify KfECTI_T_EngCoolHotLoThresh (122) is less than KfECTI_T_EngCoolHotHiThresh (125)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 30 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 mph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position	> 68.00 pct		
					or Clutch Pedal Position	< 25.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						PTO not active Transfer Case not in 4WD LowState 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		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 5 sec		
						The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	1,280 failures out of 1,600 samples Performed every 6.25 msec	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 95.00 percent Deadband: < 5 percent or > 95 percent	Oil Pressure Sensor In Use Diagnostic Status	Yes Enabled	1,280 failures out of 1,600 samples Performed every 6.25 msec	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Speed Sensor Circuit [Electro-Viscous Engine-Driven Fan Only]	P0526	Diagnoses the engine driven cooling fan speed sensor	Measured Cooling Fan Speed	< 4.00 RPM	a) Commanded Fan Output Duty Cycle [FEAR_Pct_PWM_Output DutyCycle] b) Diagnostic enabled c) Timer - Test Enable	a) >= 39.00 % b) == TRUE c) >= 2.00 seconds	250.00 failures / 300.00 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.
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	> 92 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.
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.	< 158 [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.	> 900 [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 A, 1 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(550.00 , 550.00 + 0.00)[rpm]
						
						<hysteresis(1,560.00 , 1,560.00 + 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			
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature	(OBD Coolant Enable Criteria	== TRUE		
					OR			
					engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
			}		)			
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):** {		and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
					and vehicle speed	< 3.00 [kph]		
			<u>transmission in Gear:</u> Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature	and enabled in the combustion mode	**P054E_IFM_CombModesEnbl**		
					and Accelerator Pedal Position	<= 0.05 [%]		
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature	and Engine running	-		
					and PTO_PTO_Active	== 0 [Boolean]		
					and Run Crank voltage	>= 11.00 [V]		
			}		and if the transmission is manual			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
					
					OR
					
					the clutch pedal position
					)
					
					NLT_Active
					
					and
					No active DTC's:
					
					Depending on the
					OAT Source Calibration =
					CeOATR_e_ECM_OAT_Sensor
					(
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					)
						
						> 0.00
						
						< 0.00
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						NLT_ActvErr
						
						(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**:
			{
			<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
				> 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
					{
					<u>CeFULR_e_InGear</u>:
					transmission
					
					<u>CeFULR_e_NeutralPark</u>:
					transmission
					
					<u>CeFULR_e_InGearNeutralPark:</u>
					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(550.00 , 550.00 + 0.00) [rpm]
						
						< hysteresis(1,560.00 , 1,560.00 + 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
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			default:
				> 1.5* **P054F_IFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature
					{
					OBD Coolant Enable Criteria
					
					OR
					engine coolant temperature
					
					}
					
					and
					outside air temperature
					
					and
					vehicle speed
					
					and
					enabled in the combustion mode
					
					and
					Accelerator Pedal Position
					
					and
					Engine running
					
					and
					PTO_PTO_Active
					
					and
					Run Crank voltage
					
					and
					if the transmission is manual
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						< 3.00 [kph]
						
						P054F_IFM_CombModesEnbl
						
						<= 0.05 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]
						
						> 0.00		

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
					OR
					
					the clutch pedal position
					)
					
					NLT_Active
					
					and
					No active DTC's:
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						< 0.00
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						NLT_ActvErr
						
						(FUL_GenericInjSysFA AND FUL_GenericInjSysFlt
						)		

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 ≥ 6.00 volts	50 failures out of 63 samples 100 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Detects a low 12V battery system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value.	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Run Crank voltage Engine speed >=	1.00 Voltage ≥ 6.00 volts 400.00	400 failures out of 500 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage High	P0563	Detects a high 12V battery system. This diagnostic reports the DTC when battery voltage is high.	System voltage high	Battery voltage >= 18.00	System voltage high diag enable = TRUE Run Crank voltage	1.00 Voltage ≥ 6.00 volts	400 failures out of 500 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 250.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.33 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	15.00	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.
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.
Active Grill Air Shutter B Performance /Stuck OFF	P05AE	A 2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. 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 2 Position Response AND Shutter 2 Diagnostic Delay Threshold count	<> Smart Shutter Actuator 2 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 Shutter2 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1.00 failures out of 1.00 samples 1 sample / 100 milliseconds	Type B, 2 Trips
			Shutter 2 Performance Test count	= 5.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter2 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >	0.47500 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		Test is Enabled: 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			Test is Enabled: 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			Test is Enabled: 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		Test is Enabled: 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	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 1 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's			Test is Enabled: 1	12.5 to 25 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			configuration register masks versus known good data			(If 0, this test is disabled)		
			Checks number of stack over/under flow since last powerup reset >=	3		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 0 (If 0, this test is disabled)	variable, depends on length of time to write flash to	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage 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	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage 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.
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 < 40.00) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 11.00 [V] - - 40.00 [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	> 58.00 [V] OR < hysteresis(40.00 , 41.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	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.
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	Detects an inoperative malfunction indicator lamp control low side driver circuit. This diagnostic reports the DTC when an open circuit is detected.	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	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 K 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 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	Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: ≤ 0.5 Ω impedance between output and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Control module relay feedback circuit low voltage	Powertrain relay voltage <= 5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type A, 1 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	Detects higher than expected voltage in the powertrain relay feedback circuit. This diagnostic reports the DTC when higher than expected voltage is present. For example, the powertrain relay could be stuck on. Monitoring occurs when the relay is commanded "off" for a calibrated duration.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay commanded “OFF” No active DTCs:	>= 2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	50.00 failures out of 63.00 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	50.00 failures out of 63.00 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.
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.
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.
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) OR Serial Communication message ($1C7/$1C9 for engine torque, $1CA/ $1C6 for axle torque) rolling count index value OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period Torque request greater than torque request diagnostic maximum threshold	Message <> 2's complement of message Message rolling count value <> previous message rolling count value plus one Requested torque intervention type toggles from not increasing request to increasing request > 250 Nm for engine torque based traction torque system, OR > 4,000 Nm for axle torque based traction torque system	Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = True = Traction Present	>= 6 failures out of 10 Performed on every received message 6 rolling count failures out of 10 samples Performed on every received message >= 3 multi-transitions out of 5 samples. Performed every 200 ms >= 6 out of 10 samples Performed on every received message	Type C, No SVS Safety Special Type C

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		100 failures out of 125 samples 12.5 ms / sample	Type B, 2 Trips
					Fuel Pump Driver Control Module System Voltage Performance diagnostic is enabled	= 1		
					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			

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 >= 2.00 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	200 failures out of 250 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.
Turbocharger Boost Control Signal Message Counter Incorrect	P100A	This DTC monitors for an error in communication with the Turbocharger Boost Control Signal	Communication of the Turbo Actuator Error Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Status Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Learned Relative Position Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Actual Position Alive Rolling Count or Protection Value	>= 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 And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On	Executes in 10ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Supply Voltage Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Temperature Unprocessed Value Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Learned Absolute Position Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect 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.
Turbocharger VGT A Initial Position Exceeded Learning Limit (VGT Smart)	P100B	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at End Of Line during the learning procedure is plausibile	physical travel measured at End Of Line < low threshold OR physical travel measured at End Of Line > high threshold	< 217.00 [counts] OR > 285.00 [counts]	Test enabled by calibration End Of Line Learning procedure at key off has been successfully completed End Of Trip event has elapsed No fault validated on smart VGT rolling counters	== 1.00 CFM_VGT_CommFA ==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.
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_ChassisFuelPressSysType 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_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) == 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_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) == 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 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.
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.
Reductant Injector Temperature - Exhaust Gas Temperature Not Plausible	P10D1	This monitor measures the temperature of DEF injector coil and compares to reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	> 55.00	Test enabled by calibration (TRUE->Enable False -> Disable)	1.00	Single decision criteria. Function Task: 25ms	Type B, 2 Trips
					DEF Injector Fault State (No fault on injector)	== FALSE		
					Powertrain relay in range	== TRUE		
					Long Engine off soak period has elapsed (sec)	>= 28,800.00		
					Service Test	== FALSE		
					Run/Crank is Active	== TRUE		
					Engine in Cranking Phase	== FALSE		
					Powertrain Relay in-Range	== TRUE		
					Diag System Disable	== FALSE		
					Coil Temp Rationality Diag Inhibited	== FALSE		
					Coil Temperature Estimation Available	== TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>= 1.00 [s]		
					Runk Crank Relay voltage in range	> 11.00 [V]		
					The engine has not run for a calibratable time since last key off	>= 28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	< 45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler down air temperature sensors	CIT_CAC_DwnCktFA ==FALSE OR CIT_CAC_DwnSelfCorFA ==FALSE		
					No faults detected on intake manifold air	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	< 7.11 [ohm]	Test enabled by calibration	== 1.00	20.00 fail counter over 24.00 sample counter	Type B, 2 Trips
					Engine not cranking			
					Runk Crank Relay voltage in range	> 11.00 [V]	Functional task: 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 753,016.00 [ohm]	Test enabled by calibration	== 1.00	20.00 fail counter over 24.00 sample counter	Type B, 2 Trips
					Engine not cranking			
					Runk Crank Relay voltage in range	> 11.00 [V]	Functional task: 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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] < -40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_DwnCktFA ==FALSE	40.00 fail counter over 50.00 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.
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.
Water in Fuel Signal Message Counter Incorrect	P1103	This DTC monitors for an error in communication with the Water in Fuel Signal	Communication of the Alive Rolling Count or Protection Value from the FTZM 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 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 C, No SVS

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	≥ 50.0 ºC ≥ 20.0 and < 50.0 ºC ≤ 20.0 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 ≥ -20 ºC = False ================== ≥ 20.0 ºC and < 50.0 ºC < 120.0 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 20.0 ºC and the time spent cranking the engine without starting is ≥ 120.0 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	> 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below 1b ≥ 8.0 ºC 5.0 <= 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.
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|	> 30 [°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.	> 25 [°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.
Exhaust gas temperature sensor (EGT) 4 plausibility at key on monitoring	P113E	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 4 (EGT4) 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) – EGT4 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 and with No eletrical puntual error 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_ExhGas4_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) 5 plausibility at key on monitoring	P113F	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 5 (EGT5) 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) – EGT5 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 and with No eletrical puntual error and Reference temperature calculation done: - key on and with - minimum engine-off time and with - Number of sensor availablefor calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas5_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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 (if present)	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 (if present)	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.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 30.00 °C	Key is turned on		No time debounce	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on	NOT(SBR_RlyFA)		
					No electrical fault active on Soot Sensor bus relay			
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time	> 9.00 V > 0.10 s		
					No electrical fault detected on Soot Sensor	NOT(SOT_EleclFlt)		
					If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass	TPTKO on P1477 TPTKO on P1478		
					Ambient Air pressure	> 70.00 KPa		
					Ambient air pressure sensor not faulty	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					Time since Soot Sensor heating off when the sensor temperature has	> 600.00 s		

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	NOT(ModuleOffTimeErr)		
					Calculation of the reference temperature at system start up is valid:	EGT_TempAvgVld		
					- minimum time from the previous key off to enable the reference temperature calculation	> 28,800.00		
					Diagnostic has not yet reported a pass or failure	NOT (TPTKO OR TFTKO) on P118B		

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) > (Measured EGT1 - Modeled EGT1) <	100.00 degC OR -127.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT1_DiagMdlFlt and Engine Off Timer and EGT1 Model Temperature and EGT1 Model Temperature and Dynamick check Valid and No faults on the consumed EGT sensors	1.00 > 11.00 Volts == FALSE > = 0.00 seconds > -40.00 degC < 900.00 degC ==TRUE EGT_ExhGas1_StkFA and EGT_ExhGas1_StkTFTKO and EGT_ExhGas1_CktFA and	6.00 fail samples out of 8.00 Each sample is 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.
					and	EGT_ExhGas1_CktTFTKO and EGT_ExhGas2_QckChgFA and EGT_ExhGas1_QckChgTFTKO		
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time after warm up	>= 90.00 seconds		
					and			
					Continuos engine run time	>= 210.00 seconds		
					and			
					Fuel Rate and Engine Speed within bounds, determined by calibration map	**EGT1 DynChk EngPtEnbl**		
					and			
					Model Temperature Rate of change limited to:	8.00 degC		
					over a time period of:	CeEGTR_e_IndexMax5000ms		
					Enabling delay time	4.00 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) > (Measured EGT2 - Modeled EGT2) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT2_DiagMdlFlt and Engine Off Timer and EGT2 Model Temperature and EGT2 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds > -40.00 degC < 900.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 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.
					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		
					and			
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continuos engine run time	>= 210.00 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	**EGT2 DynChk EngPtEnbl**		
					and			
					Model Temperature Rate of change limited to:	< 4.00 degC		
					over a time period of:	CeEGTR_e_IndexMax5000ms		
					Enabling delay time	4.00 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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) > Measured EGT3 - Modeled EGT3) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT3_DiagMdlFlt and Engine Off Timer and EGT3 Model Temperature and EGT3 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds > -40.00 degC < 900.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 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.
					No faults on the consumed EGT sensors			
					and	EGT_ExhGas3_CktFA and EGT_ExhGas3_CktTFTKO and EGT_ExhGas3_QckChgFA and EGT_ExhGas3_QckChgTFTKO and EGT_ExhGas3_StkFA and EGT_ExhGas3_StkTFTKO		
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continuos engine run time	>= 210.00 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	**EGT3 DynChk EngPtEnbl**		
					and			
					Model Temperature Rate of change limited to:	< 4.00 degC		
					over a time period of:	CeEGTR_e_IndexMax5000ms		
					Enabling delay time	4.00 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 4	P1197	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 EGT4 - Modeled EGT4) > Measured EGT4 - Modeled EGT4) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT4_DiagMdlFlt and Engine Off Timer and EGT4 Model Temperature and EGT4 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds > -40.00 degC < 900.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 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.
					No faults on the consumed EGT sensors and	EGT_ExhGas4_CktFA and EGT_ExhGas4_CktTFTKO and EGT_ExhGas4_QckChgFA and EGT_ExhGas4_QckChgTFTKO and EGT_ExhGas4_StkFA and EGT_ExhGas4_StkTFTKO		
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continuos engine run time	>= 210.00 seconds		
					and			
					Fuel Rate and Engine Speed within bounds,	**EGT4 DynChk EngPtEnbl**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	 < 4.00 degC CeEGTR_e_IndexMax5000ms 4.00 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 5	P1198	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 EGT5 - Modeled EGT5) > Measured EGT5 - Modeled EGT5) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT5_DiagMdlFlt and Engine Off Timer and EGT5 Model Temperature and EGT5 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds > -40.00 degC < 900.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 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.
					No faults on the consumed EGT sensors	EGT_ExhGas5_CktFA		
						and EGT_ExhGas5_CktTFTKO		
					and	and EGT_ExhGas5_QckChgFA		
						and EGT_ExhGas5_QckChgTFTKO		
						and EGT_ExhGas5_StkFA		
						and EGT_ExhGas5_StkTFTKO		
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continuos engine run time	>= 210.00 seconds		
					and			
					Fuel Rate and Engine Speed within bounds, determined by calibration map	**EGT5 DynChk EngPtEnbl**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					Model Temperature Rate of change limited to:	< 4.00 degC		
					over a time period of:	CeEGTR_e_IndexMax5000ms		
					Enabling delay time	4.00 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Performance During Deceleration Fuel Cut Off Bank 1 Sensor 2 (SCR: NOx Sensor Downstream Turbine)	P11B3	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 overrun condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 3.01 [%] < -3.18 [%]	Engine running		EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRlb ==FALSE		
					Sensor 1 is fully operative	OXY_O2_NOx1_PresCmpNotRlb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld (MAF_SensorFA AND MAF_SensorTFTKO) OXY_NOx1_O2_Flt OXY_NOx2SignRngChkFlt NOX_Snsr2_PresFlt		
					DTC P2297 is running	(see P2297 Fault code)		
					Air mass flown since P2297	> 30.00 [g]		

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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:P30B5	P30B5		

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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	< -41 % OR > 80.00 %	Engine is running	TRUE	Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 1 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: - 0.50 if FIR is active - 0.35 if RR is active - 0.20 if neither FIR and RR are active	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					No failure on any NOx model inputs	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					Injection small quantity adjustment (SQA) learning is not active	FAD_SQA_LrnET_Enbl ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
					No out of range low failure on NOx1 Sensor	NOX_NOx1_OutOfRngLoFlt ==FALSE		
					No out of range high failure on NOx1 Sensor	NOX_NOx1_OutOfRngHiFlt ==FALSE		
					No current control failure on NOx1 Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No offset failure on NOx1 Sensor	NOX_NOx1_OfstMontrFlt ==FALSE		
					No increasing dynamic failure on NOx1 Sensor	NOX_NOx1_IncrDynChkFlt ==FALSE		
					No decreasing dynamic failure on NOx1 Sensor	NOX_NOx1_DecrDynChkFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							(1) The EWMA filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	
					No DTC set:	P30B4		
					No failure on outside air temperature Sensor	OAT_PtEstFiltFA ==FALSE		
					No failure on ambient air temperature Sensor	AmbPresDfltdStatus ==FALSE		
					no falut on upstream catalyst exhaust pressure model inputs	EGP_PresCatUpFlt ==FALSE		
					No failure on engine coolant temperature Sensor	ECT_Sensor_FA ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakageFA ==FALSE		
					No failure on intake manifold absolute pressure Sensor	MAP_SensorFA==FALSE		
					Modeled Engine Out NOx concentration	> 100 ppm		
					Steady state detection: a) Modeled Engine Out NOx concentration step at 100 ms.	< 5 ppm		
					b) condition a) is fulfilled for time	> 5.00 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 70 kPa < 200 kPa		
					Outside air temperature	> -20 °C < 300 °C		
					Combustion mode dependent enabling flag	**NOX_S1_PlausChkEnblCmbMode**		
					Intake manifold absolute pressure	< 250 kPA		
					Injection fuel quantity requested	For normal combustion mode: > 15.00 mm^3 < 57.00 mm^3 For other combustion modes: > 15 mm^3 < 30 mm^3		
					Engine speed	For normal combustion mode: > 1,050 rpm < 1,950 rpm For other combustion modes: > 1,200 rpm < 3,200 rpm		
					Engine coolant temperature	> 70 °C < 129 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	< -19.00 ppm > 79.00 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 % < 400.00 g/s > 0.00 g/s < 700.00 mg/s > -1.00 mg/s < 4,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 350.00 g and Upstream NOx signal is stable for at least 1.00 s. The NOx value used for the monitor is calculated after sampling up to 5.00 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	> 550.00 rpm		
					Upstream NOx sensor temperature is within a range	< 325.00 °C > -7.00 °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	 < 20.00 mm^3/s < 0.00 mm^3 > -1.00 mm^3 > 1.00 s		
					Intake manifold absolute pressure	< 1,000.00 kPa		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE NOX_Snsr1_FltSt ==FALSE		
					No electrical failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_OutOfRngLoFlt ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngHiFlt ==FALSE		
					No out of range high failure on NOx1 sensor	NOX_NOx1_NOxPlausFlt ==FALSE		
					No failure on NOx1 sensor signal plausibility	NOX_NOx1_DynChkFlt ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakageFA ==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		
					No DTC set:	P30B4		

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)	< -75.00 ppm > 400.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Post Catalyst NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range	**NOX_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 % < 400.00 g/s > 0.00 g/s < 500.00 mg/s > -1.00 mg/s	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 50.00 g and Post Catalyst NOx signal is stable for at least 0.25 s. The NOx value used for the monitor is calculated after sampling up to 5.00 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.
					Engine speed is within a range	< 4,500.00 rpm > 550.00 rpm		
					Post Catalyst NOx Sensor temperature is within a range	< 300.00 °C > -7.00 °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	 < 20.00 mm^3/s < 2.00 mm^3 > -1.00 mm^3 > 1.00 s		
					Intake manifold absolute pressure	< 1,000.00 kPa		
					No failure on intake manifold absolute pressure Sensor	MAP_SensorFA==FALSE		
					No electrical failure on 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_OutOfRngLo Flt ==FALSE		
					No out of range high failure on NOx2 Sensor	NOX_NOx2_OutOfRngHi Flt ==FALSE		
					No failure on NOx2	NOX_NOx2_SelfDiagFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Sensor signal plausibility	==FALSE		
					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_InjLeakageFA ==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	 < 15.00 °C/s > -50.00 °C/s > 60.00 s		
					No failure on Downstream SCR temperature Sensor	NOX_Snsr2_TempFlt ==FALSE		
					No failure on upstream SCR temperature	EGT_TempSCR_UpFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No O2 plausibility in load fault on NOx2 No DTC set:	OXY_NOx2ChkLoadFlt ==FALSE P30B5		

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 NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) 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** <= 35.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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** <= 35.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	 >= 15 counts >= 16 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.
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]	160.00 fail counts out of 200.00 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	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	< 85.00 [%5V] OR > 94.00 [%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 >= 70.00 [°C] <= 129.00 [°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.
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 Rail PRessure Sensor configuration calibrated as *Double Track*	 ≥ 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 Rail PRessure Sensor configuration calibrated as *Double Track*	 ≥ 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	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.
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.
Fuel Pump Control Module (Fuel Tank Zone Module) Control Signal Message Counter Incorrect	P12A8	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Control Signal Message	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 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.
Glow Plug Control Module Diagnostic Status Signal 1 Message Counter Incorrect	P139A	This DTC monitors for an error in communication with the Glow Plug Control Module Diagnostic Status Signal 1 Message.	Communication of the Alive Rolling Count or Protection Value of the Glow Plug Control Module Diagnostic Status Signal 1 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 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.
Glow Plug Control Module Diagnostic Status Signal 2 Message Counter Incorrect	P139B	This DTC monitors for an error in communication with the Glow Plug Control Module Diagnostic Status Signal 2 Message.	Communication of the Alive Rolling Count or Protection Value of the Glow Plug Control Module Diagnostic Status Signal 2 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 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.
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	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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]	160.00 fail counts out of 200.00 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.
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	**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]	>= 250.00 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	> 0.10 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					OBD Coolant Enable Criteria	==TRUE		
					Throttle measured position	> 85.00 [%]		
					Outside air temperature	> -20.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 69.60 [kPa]		
					Engine speed in range	> 1,100.00 [rpm] AND < 2,000.00 [rpm]		
					Desired fuel quantity in range	> 25.00 [mm^3] AND < 50.00 [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 350.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> -30.00 [mg/s] AND < -10.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	< 0 [mg]		
					EGR valve position OR it is above that threshold for a time	<= 55.00 [%] >= 100.00 [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]	>= 250.00 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	> 0.10 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					OBD Coolant Enable Criteria	==TRUE		
					Throttle measured position	> 85.00 [%]		
					Outside air temperature	> -20.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 69.60 [kPa]		
					Engine speed in range	> 1,200.00 [rpm] AND < 1,600.00 [rpm]		
					Desired fuel quantity in range	> 50.00 [mm^3] AND < 120.00 [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 350.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> 2.00 [mg/s] AND < 40.00 [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.
Exhaust Gas Recirculation Current Range/ Performance	P140F	This monitor checks if an excessive current flows through the HP EGR DC-Motor (e.g. shunt circuit between load, HP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No faults present on HP EGR DC Motor current range/performance	EGR_MtrCurrLimTFTKO == FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Shorted (ECB DC Motor)	P1413	This monitor checks if the HP EGR cooler bypass valve commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	== 1.00	106.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Current Range/ Performance (ECB DC Motor)	P1414	This monitor checks if an excessive current flows through the HP EGR cooler bypass DC-Motor (e.g. shunt circuit between load, HP EGR cooler bypass DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No faults present on HP EGR Cooler Bypass DC Motor current range/ performance	CEB_MtrCurrLimTFTKO == FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Motor Overtemperature	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 IAT Not Plausible	P1428	The power up temperatue varies too much from reference sensor after long soak	if the power up initial value of the temp sensor varies more than allowed from the reference temp sensor	Temperature Delta from MAT. at powerup > 20 °C	Engine soak (not run) time No P codes	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119	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 IAT Not Plausible	P142A	The power up temperatue varies too much from reference sensor after long soak	if the power up initial value of the temp sensor varies more than allowed from the reference temp sensor	Temperature Delta from MAT. at powerup > 20 °C	Engine soak (not run) time No P codes	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119	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.
Exhaust Gas Recirculation Cooler Bypass Valve Supply Circuit (ECB DC Motor)	P1438	This monitor checks if the HP EGR cooler bypass DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control System Diagnostic Signals Message Counter Incorrect	P143A	This DTC monitors for an error in communication with the Reductant Control System Diagnostic Signals	Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Diagnostic Information 1 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Diagnostic Controller Information 2 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Diagnostic Information 3 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	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.
Reductant Control System Information Signals Message Counter Incorrect	P143B	This DTC monitors for an error in communication with the Reductant Control System Information Signals	Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Reductant Sensor Data over CAN bus is incorrect for	>= 8.00 counts	Message frame	= Is available	Executes in 10ms loop.	Type A, 1 Trips
			out of total samples	>= 10.00 counts	All the following conditions are met for	>= 3,000.00 milliseconds		
			Or		Power Mode	= Run		
			Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Information 1 over CAN bus is incorrect for	>= 8.00 counts	Powertrain Relay Voltage	>= 11.00 Volts		
			out of total samples	>= 10.00 counts	Run/Crank Ignition Voltage	>= 11.00 Volts		
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Information 2 over CAN bus is incorrect for	>= 8.00 counts				
			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.
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.
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):**		Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	Type B, 2 Trips
			Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	> 100.00 degC	Regeneration state in warm up DPF Mode	DPF_DPF_St== Warm_Up		
					DPF temperature closed loop control shall be enabled	EGT_DsblCL== Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on DOC downstream temperature sensor	EGT_SnsrCatDwnFlt [Boolean]		
					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	**EnginePointEnable_DPF_TempDeviation** [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow AND	< 250.00 [g/s]		
					Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					The system shall not be in cut off for a calibratable timer.	< 30.00 [sec]		
					No fault on ambient temperature sensor (only SCR forward architecture)	OAT_PtEstFiltFA		
					No fault on ambietnt pressure sensor (only SCR forward architecture)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTKO		
					All the above enabling conditions met for at least a calibratable timer	> 10.00 [sec]		
			Low Temperature monitoring (Positive Deviation):		Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples	
			Temperature ccDOC Downstream control setpoint	> 100.00 degC	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state	Function task:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			- ccDOC Downstream sensor reading (EGT2)		DPF temperature closed loop control shall be enabled	EGT_DsblCL == Enable temperature Closed loop control [Boolean]	100ms	
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on ccDOC Downstream temperature sensor	EGT_SnsrCatDwnFlt [Boolean]		
					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	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow AND	< 250.00 [g/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					The system shall not be in cut off for a calibratable time	< 30.00 [sec]		
					No fault on ambient temperature sensor (only SCR forward architecture)	OAT_PtEstFiltFA		
					No fault on ambietnt pressure sensor (only SCR forward architecture)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTKO		
					All the above enabling conditions met for at least a calibratable timer	> 7.50 [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	<u>Diagnosis executed in Soot Sensor Control Unit:</u> Soot Sensor Electode supply voltage signal (i.e. measured ADC voltage for electrode current)	< 0.3 V	<u>Soot Sensor Control Unit conditions</u>: Battery Voltage Soot Sensor Electrode Supply Voltage <u>ECU conditions</u>: 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: 40.00 failures out of 80.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: 42.00 failures out of 84.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: Soot Sensor Electrode Voltage Disabled ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 6.00 consecutive failures OR 15.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips
			Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	 > 2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage Disabled ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor	 NOT(SBR_RlyFA) NOT(U02A3)	Time counter: 6.00 consecutive failures OR 15.00 failures out of 20.00 samples 100 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P24D0)		

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		Time counter: 40.00 failures out of 80.00 samples 1000 ms/sample	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No electrical fault detected on Soot Sensor	NOT(SOT_EleclFlt)		
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P24D0)		

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		No time debouce	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No Soot Sensor supply undervoltage detected	NOT(P24D0)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No electrical fault detected on Soot Sensor	NOT(SOT_EleclFlt)		
					Soot Sensor is in measurement phase			
					Soot Sensor Electrode supply voltage	41.00 V < U < 50.00 V		
					Soot Sensor temperature	200.00 °C < T < 425.00 °C		
					Soot Sensor Electrode current measurement enabled			

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)	> 5,000.00 < 10.21 V	Key is turned on		No debounce time	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Engine in running mode			
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	(U02A3)		
					No Soot Sensor supply undervoltage detected	NOT(P24D0)		
					No electrical fault detected on Soot Sensor	NOT(SOT_ElecFlt)		
					No fault on exhaust gas pressure estimation at sensor location	SOT_ExhPresSootSnsrVld		
					No fault on exhaust gas temperature estimation at sensor location	SOT_ExhTempSootSnsrVld		
					No fault on gas mass flow estimation at sensor location	SOT_TotExhSootSnsrVld		
					Soot Sensor in protection heating operating state			
					Derivative in volumetric flow	3.00 < d2V < 100.00		

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	> 70.0 kPa		
					Diagnostic has not yet reported a pass or failure			
					The sign of derivative in volumetric flow does not change for a time	>= 0.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Electric Water Pump Status Message Counter Incorrect	P14A0	This DTC monitors for an internal error or error in communication with the Charge Air Cooler Electric Water Pump Status Message Counter.	Communication of the Alive Rolling Count from the Charge Air Cooler Electric Water Pump over LIN 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 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.
Fuel Pump Driver Control Module Configuration Status Signal Message Counter Incorrect	P14CE	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Status Signal.	Communication of the Alive Rolling Count or Protection Value of the Fuel Pump Driver Control Module Configuration Status 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 available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request signal in $19D	Communication of the Alive Rolling Count or Protection Value in the Transmission Engine Speed signal 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.
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.
Communication Error with Active Grill Air Shutter Module “B”	P151F	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module B	Communication of the Alive Rolling Count from the Shutter Module B over LIN bus is incorrect or the Shutter Module B 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.
Cruise Control Switch State Undertermined	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 0.5 seconds			fail continuously for greater than 0.5 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.
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.
Power Take-Off (PTO) Engine Speed Request Circuit	P1598		If Either Platform Engine Speed Command Alive Rolling Count error or Platform Engine Speed Command Protec-tion Value are TRUE 4.1.4.11.1.1 Sliding Window Verification Error. The ECM shall perform a “sliding window” check on Platform Engine Speed Command as indicated in GM8772 Section 3 PPEI Serial Data Architecture. The existence of X Signal Verification Errors (either Plat-form Engine Speed Command Alive Rolling Count error or Platform Engine Speed Command Protection Value error) within a window of Y consecutive frames shall constitute a Sliding Window Verification Error. The value of Y shall be between 8 and 16. Typical values for X and Y are X = 4 and Y = 10.	BOOLEAN	KePTOI_t_SerialDataFail = 0.5 sec	KePTOI_b_SerialDataFail Enbl = TRUE	Diagnostic runs in every 25 ms loop 0.5 sec AFTER ANY ERROR IS DETECTED.	NO

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			4.1.4.11.1.2 Maximum Elapsed Time Since Last Valid Signals. The ECM shall keep track of the elapsed time since the last valid Platform Engine Speed Command signal had been received. A valid Platform Engine Speed Command requires no signal verification error. If the elapsed time exceeds K_PTO_SignalTimeOut, power take off shall be disabled and engagement shall not be allowed until recovery conditions have been satisfied. Recovery consists of the reception of between 20 and 40 consecutive Platform Engine Speed Command frames without any signal verification errors present. No DTC shall be set associated with this elapsed time condition.					
			Recovery consists of the reception of between 20 and 40 consecutive Platform Engine Speed Command frames without any signal verification errors present.	COUNTS	KePTOI_Cnt_SerialDataFail = 4.0	KePTOI_b_SerialDataFailEnbl = TRUE	Diagnostic runs in every 25 ms loop AFTER the slide verification Window is cleared.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			No DTC shall be set associated with this elapsed time condition.					
			If Either Platform Engine Speed Command Alive Rolling Count error or Platform Engine Speed Command Protec-tion Value Are FALSE or After Recovery case	BOOLEAN	none	KePTOI_b_SerialDataFailEnbl = TRUE	Diagnostic runs in every 25 ms loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Power Take-Off (PTO) Remote Engine Shutdown Switch Circuit	P159C	This DTC Indicates that the Powertrain electronics diagnostic for the PTO remote engine shutdown hardwire input has not passed.	4.1.4.11.3 PTO Remote Engine Shutdown Hardwire Input The Powertrain electronics shall diagnose the PTO remote engine shutdown hardwire input based on the fol-lowing criteria: Pass Criteria: a.The Powertrain electronics has “Powered up”. b.The PTO remote engine hardwire shutdown input has transitioned to“Low” c.The PTO remote engine hardwire shutdown input has transitioned from “Low” (active) to “High” (Inactive) within K_PTO_Rmt_Shutdown_Init_Time. d.After the execution of item b (above), the value of the following signals shall be equal to “FALSE –INACTIVE”. (1)The serial data signal, Power Take Off Remote Engine Shutdown Requested, and (2)The PTO Remote Engine Shutdown hardwire input.	BOOLEAN	Time since change of State from LOW STATE to HIGH STATE After the first transition: Time since Serial Shutdowns of PTOM has been received and are equal.	BePTOF_b_EngShutDwnEnbl = TRUE AND BePTOF_e_EngSpdCmdSysType = CePTOR_e_StationaryPTO AND KePTOI_b_EngShutDiagEnbl = TRUE	Diagnostic runs in every 6.25 ms loop Diagnostic report pass if conditions are met in KePTOI_t_RmtShutInitTmr = 5.0 Sec AND KePTOI_t_EngShutFailTmr = 1.0 Sec	NO

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			e.If a failure code has been set, recovery is allowed if pass conditions are satisfied.					
			Fail Criteria a.A failure code shall be set if the Powertrain electronics has “Powered up” and any of the following condi-tions have been met: (1)The PTO remote engine shutdown input transition from “Low” (active) to “High” (Inactive) has not occurred within K_PTO_Rmt_Shutdown_Init_Time, or (2)After the execution of item b (above), the values of the following signals are not equal to “FALSE – INACTIVE”. K_PTO_Rmt_Shutdown_Fail_Time, a)The serial data signal, Power Take Off Remote Engine Shutdown Requested, and b)The PTO Remote Engine Shutdown hardwire input.	BOOLEAN	Time elapsed and no change of State is detected. After the first transition: Time reached and Serial Shutdowns of PTOM has been received and is Diferent.	BePTOF_b_EngShutDwnEnbl = TRUE AND BePTOF_e_EngSpdCmdSysType = CePTOR_e_StationaryPTO AND KePTOI_b_EngShutDiagEnbl = TRUE	Diagnostic runs in every 6.25 ms loop Diagnostic report pass if conditions are met in KePTOI_t_RmtShutInitTmr = 5.0 Sec AND KePTOI_t_EngShutFailTmr = 1.0 Sec	

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 driver 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_Seven_Buttons	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 driver 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_Seven_Buttons	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 driver 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_Seven_Buttons	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.
Wheel Speed Sensor Sequence Number Incorrect	P15FD	This DTC monitors wheel speed signals for an incorrect sequence	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	> 10.00 seconds > 4.00 seconds > 5.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	= 1 (1 indicates enabled) = Run or Crank >= 11.00 Volts	Diagnostic executes in 25ms loop	Type C, No SVS

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 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 > 5.50 Volts) AND Run/Crank voltage > 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 #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank – PT Relay Ignition| >	3.00 Volts		Powertrain 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 > 5.50 Volts) AND Run/Crank voltage > 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 3 Low Voltage - (Diesel Controllers ONLY)	P16BD	Detects low voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 3 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, No SVS

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 3 High Voltage - (Diesel Controllers ONLY)	P16BF	Detects high voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 3 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.
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.
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)**) + 180.00 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.
Transfer Case Control Module Transfer Case Command State Rationality - 4wd high or low command incorrect	P17D4	The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is neutral, while the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.Monitor measures transfer caes gear ratio is not 4wd high ratio nor 4wd low ratio while the transfer case control module command state is either 4wd high or 4wd low.	Measured transfer case ratio is not in Low window AND Measured transfer case ratio is not in High window	4WD low ratio window <= 2.85 >= 2.50 4WD high ratio window <= 1.20 >= 0.80			Fail count ≥ 280.00 Out of sample count ≥ 400.00 Update rate 12.5 milliseconds	Type A, 1 Trips
					Transfer case range command	≠ 4WD neutral		
					Incorrect range diagnostic enable calibration	= TRUE		
					Engine torque	>= -20.00 Nm AND <= 1,000.00 Nm		
					Ignition voltage	>= 9.00 V for >= 5.00 seconds		
					Battery voltage	>= 9.00 V for >= 5.00 seconds		
					Engine speed	>= 700.00 RPM for >= 5.00 seconds		
					Vehicle speed	>= 5.00 KM/H for >= 5.00 seconds		
					Transmission selected gear AND	Reverse or Drive (1st gear through 10th gear)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Diagnostic enable for currently selected transmission gear (Reverse, 1st through 10th gear, individually calibrated)	= TRUE		
					Transmission shift in progress	= No shift in progress for >= 5.00		
					Tap up/down mode OR Diagnostic enable for Tap up / tap down mode in current transmission gear (Reverse, 1st through 10th gear, individually calibrated)	= Inactive = TRUE		
					Transfer case range	= Prevous transfer case range for >= 5.00 seconds		
					Transmission fluid temperature	>= -7.00 degree C for >= 5.00 seconds		
					Run crank active	= TRUE		
					Diagnostics system enabled calibration	= TRUE		
					PTO OR Ratio diagnostics in PTO enabled calibration	active = TRUE		
					DTCs not fault active	Transmission Turbine Angular Velocity Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Transmission Shift Lever Position Validity Transmission Output Shaft Angular Velocity Validity P0700		

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 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.
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 OR Initialization Error - APA active ($1C6/$1C7) without an active torque request OR Exit Error - APA transitions to inactive during active torque request above a vehicle speed threshold	> 10.00 APA active boolean transitions from False to True with Torque Intervention = No request APA active boolean transitions from True to False with Torque Intervention <> No request when vehicle speed is > 1.00	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 >= 6 failures out of 10 Performed every 12.5ms When transition occurs, no number of samples Performed every 12.5ms	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Neutral Locked Turbine Signal Message Counter Incorrect	P1919	This DTC monitors for an error in communication with the Transmission Neutral Locked Turbine Signal Message.	Communication of the Alive Rolling Count or Protection Value of the Transmission Neutral Locked Turbine 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 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.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used) - (SW 18.19 and beyond)	P2002	This diagnosis detects a cracked Diesel Particulate FIlter	{The predicted soot sensor filtered by using EWMA filter is} OR {The predicted soot sensor filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	< 0.92 < 0.92 DPF_DPF_EffMontrFA = 1 (true)	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	Test per Trip: 1: If Fast Initial Response (FIR) mode is active then 2.00 test per trip are allowed If Rapid Response (RR) mode is active then 2.00 test per trip are allowed The signal for the monitor check is filtered by means a first-order filter. The filter step change can assume the following values: - 0.80 if FIR is active - 0.50 if RR is active - 0.25 if neither FIR and RR are active Initial filter value: - 0.97 when FIR is activated - 0.97 when RR is activated	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					measurement phase, Duration of Autostop phase	< 200.00 s		
					During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is	<= 150.00		
					If EWMA filter is enabled (TRUE--> enable FALSE --> disable) AND	1.00 = 1 (true)		
					number of diagnostic run for driving cycle is	< 1 (when FIR and RR are not active) < 1.00 (when FIR is active) < 1.00 (when RR is active)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Over Temperature Bank (DOC1_SCR_DOC2_DPF)(EGT5)	P200C	This diagnosis verify if the exahust gas temperature on DPF Downstream (EGT_DPF_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Downstream Exhaust gas temperature	***In Regeneration mode:*** >900.00 [°C] **In Normal mode:** > 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 Downstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	**In Normal mode:** 200.00 fail samples out of 400.00 samples **In Regeneration mode:** 200.00 fail samples out of 400.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: DPF Downstream Exhaust gas temperature	> 950.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	20.00 fail samples out of 40.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on DPF Downstream Temperature sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Over Temperature Bank 1 (DOC1_SCR_DOC2_DPF) (EGT2)	P200E	This diagnosis verify if the exahust gas temperature on ccDOC Downstream (EGT_DOC1_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** Exhaust gas temperature on ccDOC Downstream	**In Regeneration mode:** > 850.00 [°C] **In Normal mode:** > 850.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream Temperature sensor (EGT2)	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	**In Normal mode:** 200.00 fail samples out of 400.00 samples **In Regeneration mode :** 200.00 fail samples out of 400.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: Exhaust gas temperature on ccDOC Downstream	> 950.00	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	20.00 fail samples out of 40.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Temperature sensor (EGT2)			

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.	< 158.00 [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.	> 900.00 [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 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 / 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.
Fuel Level Sensor 2 Performance (For use on vehicles with dual fuel tanks and electric transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range	1. ****************************** Fuel Level in Primary and Secondary Tanks Remains in an Unreadable Range too Long ****************************** 1a) If Deadband diagnostic subtest enabled AND 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. ****************************** During fuel transfer ****************************** 2a) After expiration of fuel sloshing delay time, 2b) If minimum fuel transferred from the secondary tank is 2c) and if minimum fuel transferred into the primary tank is 2d) within time OR 3. ******************************	1a) == Disabled status 1b) ≥ 1,024.0 liters 1c) < 0.0 liters 1d) >= 18.0 liters 2a) >= 20.00 seconds 2b) > 5.00 liters 2c) < 2.50 liters 2d) <= 1,000.00 seconds	1a) Diagnostic Enabled 1b) Engine Operational Status 2b) Device control state for the electric transfer pump 2c) Fuel Volume in Secondary Tank 2d) Vehicle Speed	1a) == True 1b) == Running 2b) <> True 2c) < 141 liters 2d) < 0 mph	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.
			After a Refuel Event ****************************** 3a) If primary tank volume change from Engine Off to next Engine On condition is 3b) then secondary tank volume change must be OR 4. ****************************** Fuel consumed without a Secondary Fuel Level Change ****************************** 4a) If engine is running, and the fuel consumed is 4b) then secondary tank volume change must be OR 5. ****************************** Secondary Tank Full Indication Stuck During Fuel Transfer ****************************** 5a) If secondary tank fuel level [Full definition] is AND 5b) If engine is running, and fuel consumed is 5c) then secondary tank volume change must be	3a) >= 1,023.98 liters 3b) >= 5.00 liters 4a) >= 30 liters 4b) >= 5.00 liters 5a) > 141 liters 5b) >= 30 liters 5c) >= 5.00 liters	4a) Secondary tank volume [Not Empty] AND 4b) Secondary tank volume [Not Full] 5) Secondary Fuel Transfer Pump On Time	4a) ≥ 10 liters 4b) < 141 liters 5) ≥ 1,150 seconds		

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 138.88 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 4.95 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.
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	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector A Control Circuit/Open	P20CB	This diagnosis detects a HC Injector Command pin /wire in open circuit	HC injector HWIO Open interface fault	=TRUE (i.e. If the voltage at the AUXINJ output in the OFF state stays below Volt (1.95 to 2.175V) and Volt (2.9 V to 3.2 V) for a time longer than tdiag (40µs to 70µs)	Test Enabled by calibration Shared High Side Driver 2 commanded ON (i.e. closed) Powertrain relay voltage in range;	1.00	48.00 failures over 60.00 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 Aftertreatment Fuel Injector A Control Circuit Low	P20CD	This diagnosis detects a HC Injector Command pin /wire shortcut to ground	HC injector HWIO Short To Ground interface fault Note: If DTC failed, it will be healed only after a calibratable counter 1,000,000.00 or after ECU Reset event	=TRUE (i.e If the voltage at the AUXINJ output in the OFF state stays below Vltvt (1,95V to 2,175V) for a time longer than tdiag (40µs to 70µs)	Shared High Side Driver 2 commanded ON (i.e. closed) Powertrain relay voltage in range;		10.00 failures over 20.00 samples 100 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.
Exhaust Aftertreatment Fuel Injector A Control Circuit High	P20CE	This diagnosis detects a HC Injector Command pin /wire shortcut to power supply	HC injector HWIO Short To Power Supply interface fault	=TRUE (i.e. If the current through the AUXINJ output in the ON state is higher than Ioc1 (8A to 11A) for a time longer than toc1 = 36µs OR If the current through the AUXINJ output in ON state is higher than Ioc2 (16 A to 22A)	Powertrain relay voltage in range;		48.00 failures over 60.00 100 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.
SCR NOx Catalyst Efficiency Below Threshold Bank 1 - EWMA Enabled	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 reference efficiency: - Measured NOx conversion efficiency is calculated as η_Eff_Msrd = 1 - [∫ NOx_Dwn_Msrd / ∫ NOx_Up_Msrd] - Reference efficiency is evaluated as η_Eff_Ref = 1 - [∫ NOx_Dwn_Ref / ∫ NOx_Up_Msrd] NOx_Dwn_Ref is calsulated as	EWMA filtering is applied to the difference between measured SCR NOx conversion efficiency (η_Eff_Msrd)) and reference efficiency (η_Eff_Ref). For the calculation of η_Eff_Ref, the estimated efficiency provided by model (SCR_eff_estimated) is used if 1.00 == 0 [Boolean]. Otherwise, a fixed value of SCR_eff_estimated equal to 1 is used.	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 in Rapid Response (RR) or Fast Initial Response (FIR) state; Tests per trip up to calibratable value when EWMA filter is in Fast Initial Response (FIR)	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_DEFMV_FA ≠ SCR_ChemicalMdlFlt; Debounce = 120 [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.
		NOx_Dwn_Ref = NOx_Up_Msrd * (1 - (SCR_eff_estimated - offset))			state;			
					Total tests executed in Fast Initial Response (FIR) state up to calibratable value;	FIR tot tests < 2 ;		
		SCR_eff_estimated comes from SCR chemical model and it takes into account the estimated amount of NOx at SCR outlet:			Tests per trip up to calibratable value when EWMA filter is in Rapid Response (RR) state;	RR test trip < 2 ;		
		SCR_eff_estimated = 1 - (NOx_Dwn_Est / NOx_Up_Msrd)			Total tests executed in Rapid Response (RR) state up to calibratable value;	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];		
		The offset (**K_EffOffset**) is calibrated in order to detect a malfunction.			Debounce time elapsed after DEF defrost has been completed;	Debounce = 0 [sec];		
		Test is performed when NOx integral upstream SCR reaches 1,500.00 [mg].			Engine torque request higher than calibration;	Torque >= 0 [Nm];		
		Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			Rate of change of estimated efficiency (from SCR catalyst model) less than or equal to a calibratable value;	|Rate of change of estimated efficiency| <= 0.1 [-]		
					Debounce time elapsed when estimated efficiency stable condition becomes true;	Debounce = 3 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 > -20 [°C]; -20 [°C] < hysteresis range < -20 [°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 > 180 [°C]; 170 [°C] < hysteresis range < 180 [°C]		
					Debounce time elapsed after urea dosing activation by SCR mean	Debounce = 5 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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]); Debounce time elapsed when difference between SCR upstream and SCR downstream temperature condition becomes in range; 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; Debounce time elapsed when exhaust mass flow and SCR average temperature conditions get within limits; SCR mean temperature time derivative within limits defined by	 SCR up/down diff temperature > **T_MinTempGrad** [°C] Temperature < **T_MaxTempGrad** [°C]; Debounce = 0 [sec]; **K_EffExhFlowCond** > 1 [-]; Debounce = 1 [sec]; -10 < Delta temperature < 8 [°C/sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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;	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 evaluated and countdown starts until debounce time	NOx up flow < 400 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max debounce = 0 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					has been elapsed. Limitation on the debouce time is always applied;			
					Upstream SCR NOx flow measurement higher than calibration;	NOx up flow > 2 [mg/s];		
					Upstream SCR NOx sensor measurement higher than calibration;	NOx up > 200 [ppm];		
					Upstream SCR NOx sensor measurement lower than calibration;	NOx up < 900 [ppm];		
					Downstream SCR NOx sensor measurement higher than calibration;	NOx dwn > -111,111 [ppm];		
					Upstream SCR absolute NOx flow derivative lower than calibration;	Delta NOx up flow < 250 [mg/sec^2];		
					NO2/NOx ratio: - higher than first calibratable value AND - lower than second calibratable value;	NO2/NOx > -111,111 [-] NO2/NOx < 111,111 [-];		
					Debounce time elapsed when all NOx conditions (except upstream SCR NOx flow measurement lower than calibration) become true;	Debounce = 1 [sec];		
					Slip conditions: - debounce time elapsed when no slip is detected any more,	Debounce = 0 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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];		
					Debounce time elapsed when NH3 storage	Debounce = 3 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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);	 Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 5 [sec]; DEF concentration > 29 [Pct]; 26 [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) >	3.500 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 6.41 Volts (P2122, P2123,P2127, P2128) (P06A3, P0697)	19 / 39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Vehicle Speed – Output Shaft Speed Correlation	P215B	Detect invalid vehicle speed source. This failure is set by two different conditions. Either the absolute difference between wheel speed vehicle speed and TOS vehicle speed is too high, or secure vehicle speed is not available.	The absolute difference between wheel speed vehicle speed and TOS vehicle speed greater than > OR Secure vehicle speed source is unavailable	6.21 mph		Time since first CAN activity > 0.5000 s Secure vehicle speed source is TOS vehicle speed or wheel speed vehicle speed Trans engaged state is equal to engaged.	400 / 800 counts for wheel speed correlation or 400 / 800 counts for TOS correlation; 25ms/count	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.
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	> -1 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: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					No DTC active:	P30B4		

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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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:		Powertrain relay voltage	> 11.00 V	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips
					No loss of communcation with Engine Out Nox Sensor	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
			(Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	> 0.03 <- 0.03	No plausibility failure on NOx signal from NOx Sensor	NOX_NOx1_NOxPlausFlt ==FALSE		
					No offset failure on NOx signal from NOx Sensor	NOX_NOx1_OfstMontrFlt ==FALSE		
					No increasing dynamic failure on NOx signal coming from NOx Sensor	NOX_NOx1_IncrDynChkFlt ==FALSE		
					No decreasing dynamic failure on NOx signal coming from NOx Sensor	NOX_NOx1_DecrDynChkFlt ==FALSE		
					No circuit failure on NOx Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range high failulre on NOx Signal	NOX_NOx1_OutOfRngHiFlt ==FALSE		
					No out of range low failulre on NOx Signal	NOX_NOx1_OutOfRngLoFlt ==FALSE		
					No DTC set:	P30B4		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					NOx Sensor Bus relay is commanded ON	TRUE		
					Delay timer once sensor	> 45 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					supply is in range (> 10.8 V)			
					Delay timer once sensor dewpoint is reached	> 180 sec		
					Delay timer once engine is overrun	> 5 sec		
					Delay timer once DPF combustion mode is not active	30 sec		

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: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	> 0 sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 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] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	384 fail counters over 480 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	> 94.0 % of 5 Volt Range (This is equal to 115.0 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 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.
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 > 60.0 s > 0.10 s and < 2.00 s ≥ 8.0 V P1103 SBR_RlyFA	5 failure out of 9 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.
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)	1.00	120.00 failures over 150.00 samples Function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt		
					No fault on upstream DPF temperature sensor (electrical and rationality)	(EGT_SnsrDPF_UpFlt)		
					No fault on air flow meter	MAF_MAF_SnsrFA OR MAF_MAF_SnsrTFTKO		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNot Dfltd		
					DPF status in soot loading phase (no regeneration ongoing)	DPF_DPF_St == CeDPFR_e_SootLoading		
					Engine speed	> 800.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA		
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 70.00 [l/s] for > 10.00 [s]		
					Soot trapped in the DPF is between two thresholds	-1.00 [Pct] < Soot < 400.00 [Pct]		

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	150.00 [DegC] < Temperature < 550.00 [DegC] for > 240.00 [s]		
					Engine Coolant Temperature	> 40.00 [DegC]		
					Ambient Temperature	> -20.00 [DegC]		
					The distance covered since last regeneration	< 400.00 [%]		
					Correction of CCB model			
					The fuel request is between 2 calibrateable thresholds for a minimum calibreable time	**Lo_FR_MontrEnblLoThrsh** [mm^3] < Fuel < **Lo_FR_MontrEnblHiThrsh** [mm^3] for > 2.00 [s]		

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] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	640.00 fail counters over 800.00 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] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	384 fail counters over 480 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	< 39.3 % of 5 Volt Range (This is equal to 50.0 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	> 90.0 % of 5 Volt Range (This is equal to 115.0 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)	> 100 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	> 12 to 12 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 (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 20.0 mm^3/stroke == 1.00 == FALSE == 1.00 ≥ 60.00 == 1.00 ≥ -20.00 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 -		Run crank voltage	≥ 11.0 V	640 failures out	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			measured rail pressure	> 12 to 12 MPa (see table **P229A Positive rail pressure deviation (PR)**)	Engine running Pressure Regulator controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	 > 20.0 mm^3/stroke == 1.00 = FALSE) == 1.00 ≥ 60 kPa) == 1.00 ≥ -20 °C)	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.
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	< -17 to -17 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 (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	≥ 11.0 V > 20.0 mm^3/stroke > -40 °C == 1.00 = FALSE) == 1.00 ≥ 60.00 kPa) == 1.00 ≥ -20.00 °C)	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	< -17 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 (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	 > 20.0 mm^3/stroke == 1.00 = FALSE) == 1.00 ≥ 60 kPa) == 1.00 ≥ -20 °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.
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	> 3.02 [%] < -2.82 [%]	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**) < 1,000.00 [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:	> 3.50 [s]		
					a. Engine speed in operating range	> 600 [rpm] < 3,000 [rpm]		
					b. EGR position	< 5.00 [%]		
					c. LPE position	< 0.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 400.00 [mg] < 2,500.00 [mg]		
					Estimated O2 concentration stable i.e. difference between initial and actual value	< 0.50 [%]		
					Air mass flown since fuel cut-off condition	> 40.00 [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	> -1 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	 > 2,500 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: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					No DTC active:	P30B5		

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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Post Catalyst NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	 < 0.03 >- 0.03	Powertrain relay voltage No loss of communcation with Nox2 Sensor No offset failure on NOx signal from NOx Sensor No circuit failure on NOx Sensor No out of range high failulre on NOx Signal No out of range low failulre on NOx Signal No DTC set: No failure on NOx Sensor Bus relay circuit 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 CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE NOX_NOx2_OfstMontrFlt ==FALSE NOX_NOx2_StBitChkFlt ==FALSE NOX_NOx2_OutOfRngHiFlt ==FALSE NOX_NOx2_OutOfRngLoFlt ==FALSE P30B5 SBR_RlyFA==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	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 2 (SCR: NOx Sensor Downstream Turbine)	P22B6	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	< -4.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx2_O2_RawNotRlb == FALSE refer to supporting table **KaOXYD_b_NOx2SigRn** (**gEnblCmbMode**) NOX_Snsr2_NotVld	Time counter: 200 failures out of 250 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 2 (SCR:NOx Sensor Downstream Turbine)	P22B7	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		Time counter: 100 failures out of 200 samples. Time task 25 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Slow Response Low to High Bank 1 Sensor 1	P22F9	This diagnosis verifies the dynamic behaviour of Upstream NOx sensor during increasing NOx concentration transient	Check if there is a slow dynamic behaviour of Upstream NOx sensor raw signal read during increasing NOx concentration maneuver (load increase) Delay_Timer_NOx_Raw Delay time starts when NOx model concentration reaches 30 ppm and completes when NOx1 Sensor raw reaches 30 ppm. Relative_timer= (Timer_NOx_Raw-Timer_NOx_Model) / Timer_NOx_Model Timer_NOx_Raw Time starts once NOx1 raw signal reaches 30 ppm and completes once the raw signal reaches 220 ppm. Timer_NOx_Model Time starts once NOx model concentration reaches 30 ppm and completes once the raw signal reaches 220 ppm.	Delay_Timer_NOx_Raw and Relative_timer are processed with First Order Lag Filter Logic: > 3 sec OR > 6 %	Engine is running Powertrain relay voltage Combustion mode dependent enabling flag NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication - No electrical failure on NOx1 Sensor - No failure on NOx1 plausibility 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 Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active No failure on high pressure fuel rail system No failure on injectors No failure on intake manifold absolute pressure Sensor	TRUE > 11.00 V **NOX_NOx1_IncrDynCmbMode** TRUE NOX_Snsr1_FA ==FALSE NOX_NOx1_OutOfRngLoFlt ==FALSE NOX_NOx1_OutOfRngHiFlt ==FALSE NOX_NOx1_StBitChkFlt ==FALSE TRUE FAD_SQA_LrnET_Enbl ==FALSE FHP_InjLeakageFA ==FALSE FUL_GenericInjSysFlt ==FALSE MAP_SensorFA==FALSE	More test per trip are allowed with First Order Lag Filter Logic. Total_Timer NOx Sensor dynamic observation maximum time is 10 sec. Once reached the diagnostic provides a result.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on mass air flow Sensor	MAF_MAF_SnsrFA ==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on any input used by the Engine Out NOx model	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					No failure on NOX1 decreasing dynamic check	NOX_NOx1_DecrDynChkFlt ==FALSE		
					No failure on pressure measurement at NOx Sensor location	NOX_Snsr1_PresFlt ==FALSE		
					No offset failure on NOx1 Sensor	NOX_NOx1_OfstMontrFlt ==TRUE		
					No DTC set:	P30B4		
					Valid NO2/NOx ratio measurement at NOx Sensor location	NOX_Snsr1_NO2_NOx_RatVld ==TRUE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					Intake manifold absolute pressure	< 950 kPa		
					Engine Out NOx Sensor raw concentration	< 20 ppm		
					Engine working point stability conditions: a) Modeled Engine Out NOx concentration	< 40 ppm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					b) Engine speed	> 600 rpm < 3,500 rpm		
					c) Injection fuel quantity requested	> 3 mm^3		
					d) condition a) b) c) are fulfilled for time	> 1 sec		
					Once all condition above are fulfilled diagnostic run whenever all the following condition are verified (fuel stepdetection logic within a time window):			
					e) Injected fuel quantity request	> 14 mm^3		
					f) condition e) is fulfilled for time	<(1 sec+ 9 sec)		

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 offset failure on NOx2 Sensor No DTC active: No 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	NOX_Snsr2_ElecFA ==FALSE NOX_NOx2_OutOfRngLoFlt ==FALSE NOX_NOx2_OutOfRngHiFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE NOX_NOx2_OfstMontrFlt ==FALSE P30B5 NOX_Snsr1_NOx_Flt ==FALSE OXY_NOx1_O2_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE CrankSensor_FA ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Fast Initial Response EWMA is active then 4 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.
						==FALSE		
					No failure on Vehicle Speed Sensor	VehicleSpeedSensor_FA ==FALSE		
					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 failure on O2 from NOx2 plausibility diagnostics	OXY_NOx2_O2_Flt ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==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	> 0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					c) engine speed	> 0 rpm < 1,500 rpm		
					d) condition c) is fulfilled for time	> 1 sec		
					e) After injection pulse is not used for time	> 0 sec		
					f) exhaust temperature Sensor (downstream SCR)	> -7 °C < 265 °C		
					g) exhaust mass flow	< 40 g/s		
					h) NH3 concentration	< 20 ppm		
					j) conditions f) g) h) are fulfilled for time	> 5 sec		
					k) O2 concentration from NOx1	> 10 %		
					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	< 800 rpm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range			
					r) fuel request in idle range	< 20 mm^3		
					s) conditions q) r) is fulfillled for time	< 1,800 sec		
					t) timer of condition s) is reset if one of the following condition is fulfilled (idle off recognition - t) conditions):			
					t.1) exhaust temperature (downstream SCR)	> 200 °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	> 40 g/sec		
					t.6) condition t.5) is fulfilled for time (once idle has been detected)	> 5 sec		
					u) HC mass flow (SCR downstream)	< 10 g/s		
					Once u) condition is fulfilled the following additional u.x) conditions shall be fulfilled to enable the monitor (AND logic)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					u.1) exhaust temperature (downstream SCR)	> 200 g/s		
					u.2) condition u.1) is fulfilled for time (once condition u) has been detected)	> 20 sec		
					u.3) vehicle speed	> 5 mph		
					u.4) condition u.3) is fulfilled for time (once condition u) has been detected)	> 10 sec		
					u.5) exhaust mass flow	> 20 g/s		
					u.6) condition u.5) is fulfilled for time (once condition u) has been detected)	> 5 sec		
					v) deceleration before keyoff.	< 5.00 m/s		
					w) condition v) could be ignored if idle engine condition w.x) is fulfilled			
					w.1) engine speed in idle range	< 1.00 rpm < 10.00 rpm		
					w.2) condition w.1) fulfilled for time	> 8.00 s		
					Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off			

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.	< 158.00 [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.	> 900.00 [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	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	1.00	60.00 failures over 120.00 samples function task: 100 ms	Type A, 1 Trips
					No error on relative to ambient pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrRatFlt		
					No error on upstream DPF temperature sensor (electrical and rationality)	EGT_SnsrDPF_UpFlt		
					No error on air flow meter	MAF_MAF_SnsrFA OR MAF_MAF_SnsrTFTKO		
					No error on atmospheric pressure sensor	AmbPresDfltdStatus= CeAAPR_e_AmbPresNotDfltd		
					Exhaust gas volume flow	> 125.00 l/s		
					Engine speed	> 800.00 rpm		
					(Engine coolant temperature	> 40.00 °C		
					OR	OR		
					OBD Coolant Enable Criteria)	= TRUE)		

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 - 18.19	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 - 18.19	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|>	> 0.02 [KPa*s/m^3]	Test enabled by calibration	0 [Boolean]	40 fail samples out of 80 samples Function task: 12.5 ms	Type B, 2 Trips
					and with			
					Engine running	== TRUE		
					and with			
					Engine cranking	== FALSE		
					and with			
					key on	==TRUE		
					and with			
					Battery voltage	> 11.00 [V]		
					and with			
					No fault on exhaust gas pressure sensor (electrical, offset, quick change and stuck in range in and logic)	EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent		
					and with			
					No fault on air flow meter in and logic	MAF_SensorFA and with MAF_SensorTFTKO		
					and with			
					No fault on DPF Upstream temperature	EGT_SnsrDPF_UpFA and with		

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	<= 0.15 [%]	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	15 fail samples out of 20 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 EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent		
					and with			
					Engine speed variation greater	> 300.00 [rpm/s]		
					and with			
					Fuel quantity variation greater	> 20.00 [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 - 18.19	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]	90 fail samples out of 180 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 - 18.19	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]	90 fail samples out of 180 samples Function task: 12.5 ms	Type A, 1 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]	90 fail samples out of 180 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 - 18.19	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	40 fail samples out of 170 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) (non-MDE applications, from SW 18.xx.136 included)	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).	< 72.61 [%]	Calibration on diagnostic enabling	1.00 ==TRUE	Test executed after 200.00 samples are collected and their average is computed	Type B, 2 Trips
					Diagnostic has not run in current driving cycle yet	==TRUE		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]	functional task 100 ms	
					Engine is running or cranking	==TRUE		
					HP EGR cooler upstream temperature in range	> 95.00 [°C] < 850.00 [°C]		
					Ambient Temperature	>= -20.00 [°C]		
					Ambient pressure	>= 69.60 [kPa]		
					Air Control is Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 70.00 [°C] ==TRUE < 130.00 [°C]		
					HP EGR Cooler bypass	> 10.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for a time			
					Time after combustion mode change	> 0.00 [s]		
					HP EGR filtered flow in range	< **P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s] > **P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s]		
					for a time	>= **P2457: Minimum time for HP EGR cooler efficiency monitor enabling** [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	< 3,100.00 [rpm] > 560.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 engine coolant temperature sensor	ECT_Sensor_FA ==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 used and Configurable Correction Block not 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) and Engine Out Soot Model is AND few kilometers spent after the previous regeneration AND few time spent after the previous regeneration AND few fuel consumed after the previous regeneration	1.00 = true 0.00 = false >= 5.90	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	no time required, i.e. as soon as the malfunction criteria is satisfied	Type B, 2 Trips
					Nominal Engine Out Soot Model is used, i.e.	1.00 = 1 (true)		
					Configurable Correction Block is not used, i.e.	0.00 = 0 (false)		
					At least one successful regeneration occurs			
					Soot model based on Delta Pressure is valid for a time	>= 0.00 s		
					∆p model is always valid before start of regeneration for a time	> 0.20 % of the soot loading time		
					the Nominal Engine out soot model is valid for a time	> 0.20 % of the soot loading 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	< 255.00 mm3/s		
					DPF regeneration is not	> 50.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					requested at service (Soot percentage evaluated by Δp model 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)			

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 DC Motor)	P245A	This monitor checks if the HP EGR cooler bypass valve commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully closed (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P245B	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Cooler Bypass Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Test enabled by calibration	== 1.00	1,280.00 fail counts out of 1,600.00 sample counts 1,280.00 fail counts to enable the open circuit check (P245A) Function task: 6.25 ms	Type B, 2 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation)	CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE		
					HP EGR Cooler Bypass position setpoint in steady state conditions for minimum time	< 160.00 [%/s] > -160.00 [%/s] for >= 0.40 [s]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system	>= 70.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	> 140.00	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	120.00 failures over 150.00 samples function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt		
					No fault on upstream DPF temperature sensor (electrical and rationality)	EGT_SnsrDPF_UpFlt		
					No fault on air flow meter	MAF_MAF_SnsrFAOR MAF_MAF_SnsrTFTKO		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					DPF status insootloading phase (no regeneration ongoing)	DPF_DPF_St== CeDPFR_e_SootLoading		
					Engine speed	> 800.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA		
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 70.00 [l/s] for > 2.00 [s]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	150.00 [DegC] < Temperature < 700.00 [DegC] for > 25.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Coolant Temperature	> -40.00 [DegC]		
					Ambient Temperature	> -40.00 [DegC]		
					Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time	> = 0.20 % of the soot loading		
					Soot model based on Delta Pressure is always valid for a time	>= 30.00 s		
					Distance since last completed regeneration	> 0.00 km		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring Low	P2470	Controller specific output driver circuit diagnoses t the exhaust gas temperature 4 (EGT4) 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.	< 158 [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) 4 out of range monitoring High	P2471	Controller specific output driver circuit diagnoses the exhaust gas temperature 4 (EGT4) 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 4 (EGT4) 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.	> 900 [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
			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.	> 900 [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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 4 quick change monitoring	P2472	This diagnosis verify if the EGT4 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT4output reistance - EGT4 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 EGT4 sensorin and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas4_TFTKO and with EGT_ExhGas4_FA	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring Low	P2481	Controller specific output driver circuit diagnoses t the exhaust gas temperature 5 (EGT5) 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.	< 158 [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) 5 out of range monitoring High	P2482	Controller specific output driver circuit diagnoses the exhaust gas temperature 5 (EGT5) 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 5 (EGT5) 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.	> 900 [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
			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.	> 900 [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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 5 quick change monitoring	P2484	This diagnosis verify if the EGT5 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT5 output reistance - EGT5 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 EGT1sensorin and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas5_TFTKO and with EGT_ExhGas5_FA	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Circuit Low (analog position sensor)	P2494	This monitor checks if the HP EGR cooler bypass position analog sensor is out of electrical range low	analog position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	= 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Circuit High (analog position sensor)	P2495	This monitor checks if the HP EGR cooler bypass position analog sensor is out of electrical range high	analog position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	= 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 1.99	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 < 0.41	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 DPF Regeneration Control At Limit - Temperature Too Low	P24A0	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF (EGT4) 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, that has only the Positive deviation monitoring, and the DPF steady state logic, that has both deviation monitoring.	**Low Temperature monitoring (Positive Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DPF upstream 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 AND	1.00 [Boolean] DPF_DPF_St == Warm_Up EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] < 250.00 [g/s]	1,500.00 fail samples out of 1,850.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow	> 8.00 [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.	< 30.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 10.00 [sec]		
			Low Temperature monitoring (Positive Deviation): Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 100.00 degC	Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	
					Regeneration state in Steady state DPF Mode	DPF_DPF_St== Steady_state		
					HCI temperature closed loop control shall be enabled	EGT_HC_CL_Enbl [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on DPF upstream temperature sensor	EGT_SnsrDPF_UpFlt [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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_HC_ TempDeviation** [Boolean]		
					Exhaust mass flow	< 250.00 [g/s]		
					AND			
					Exhaust mass flow	> 8.00 [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.	< 30.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop DPF Regeneratio n Control At Limit - Temperature Too High	P24A1	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF (EGT4) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensoris 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	**High Temperature monitoring (Negative Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	< -100.00 degC	Test shall be enabled by calibratable flag Regen eration state in Steady state DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DPF upstream 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 AND	1.00 [Boolean] DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_ TempDeviation** [Boolean] < 250.00 [g/s] > 8.00 [g/s] < 100.00 [g/s]	1,500.00 fail samples out of 1,850.00 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			
						< 30.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)	> 10.00 [sec]		
					The system shall not be in cut off for a calibratable timer.			
					All the above enabling conditions met for at least a calibratable timer			

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 DC Motor)	P24A5	This monitor detects the HP EGR Cooler Bypass mechanically stuck in a certain position different from its defaulted position (fully closed, cooling mode) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR Cooler Bypass position > maximum threshold (not cooling position)	> 15.00 [%]	P245B is already set		No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type B, 2 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the vanes in their defaulted position)	> 1.00 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation)	CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==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_ElecIFlt) 560.00 < T < 800.00 °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: 18.00 failures out of 36.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	> 0 % NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 38.00 failures out of 76.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Control Unit conditions:		Time counter: 38.00 failures out of 76.00 samples 100 ms/sample	Type B, 2 Trips
			Soot Sensor Heater current	I < 0.5 A OR I > 15 A	Soot Sensor Heater Commanded on, i.e., heater duty cycle	> 0 %		
					No Soot Sensor Heater failures detected in the Sensor Control Unit			
					ECU conditions:			
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P24D0)		

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: 18.00 failures out of 36.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Exceeded Learning Limit (analog position sensor)	P24C4	This monitor checks if the HP EGR cooler bypass position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (cooling position and bypass position)	analog position raw voltage when the valve is in cooling position < low threshold OR analog position raw voltage when the valve is in cooling position > high threshold OR analog position raw voltage when the valve is in bypass position < low threshold OR analog position raw voltage when the valve is in bypass position > high threshold	< 16.00 [%5V] OR > 24.00 [%5V] OR < 60.90 [%5V] OR > 91.40 [%5V]	Test enabled by calibration Learning procedure at key off in fully closed and fully open position has been successfully completed: - engine coolant in range; - no faults present on engine coolant temperature. No faults present on HP EGR cooler bypass position sensor, HP EGR cooler bypass valve, HP EGR cooler bypass position deviation End Of Trip event has elapsed	= 1.00 >= 70.00 [°C] <= 129.00 [°C] ECT_Sensor_FA == FALSE CEB_ActrFlt == FALSE CEB_PstnSnsrFlt == FALSE CEB_ObstructionTFTKO == 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.
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	> 100.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No 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_ElecIFaultTFTKO) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNot	Time counter: 250.00 failures out of 255.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Dfltd AND NOT (VehicleSpeedSensor_FA) > 70.00 kPa > -20.00 °C > 50.00 mg/s > 300.00 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 regneration phase OR the time from a regeneration request)	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 80.00	Time counter: 8.00 failures out of 16.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 No electrical fault detected on Soot Sensor Volumetric flow estimation is valid The power ratio timer the power ratio timer increments during the steady state of soot sensor regeneration, when the ratio between power demand and power available is (Soot sensor transitioned from regeneration to	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_ElecIFlt) 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.
					measurement status OR 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.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2’s complement not equal ($189/$199) OR Rolling count error - Serial Communication message ($189/$199) rolling count index value OR Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 1,298 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic Status Power Mode Ignition Voltage Engine Running Run/Crank Active No Serial communication loss to TCM (U0101)	Enabled = Run > 6.41 volts = True > 0.50 Sec No loss of communication	>= 16 failures out of 20 samples. Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >= 6 range errors out of 10 samples. Performed on every received message >= 3 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Stuck Closed (VGT Smart)	P2599	This monitor detects the VGT vanes mechanically stuck in a certain position different from their defaulted position (fully open) when the actuator is no longer driven (missing defaulted position)	Position after P0046 has set > threshold	> 25.00 [%]	P0046 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	 > 2.00 [s] VGT_PstnSnsrOfstFA ==FALSE VGT_SmartActrFA ==FALSE CFM_VGT_CommFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 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.
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 > 100.0 milliseconds	Type A, 1 Trips
			Engine Speed less than a threshold for a period of time	Pass Condition: Engine Speed < (5,200 - 300) RPM		Engine Speed > 1,500 RPM	Pass threshold: Overspeed condition FALSE > 100.0 milliseconds	

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	< -4.00 [%]	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 250 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 < 1,000.00 [kPa] < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt (MAP_SensorFA AND MAP_SensorTFTKO)	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 2 Control Circuit Open	P2632	Controller specific output driver circuit diagnoses the secondary/Transfer feed fuel pump high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between signal and controller ground	Run/Crank Voltage	≥ 11.00 volts	20 failures out of 25 samples 250 ms / sample	Type C, No SVS Not "Special" Type C Note: In certain controllers P2634 may also set (Fuel Pump 2 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 2 Control Circuit Low	P2633	Controller specific output driver circuit diagnoses the secondary/Transfer feed fuel pump 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 Ω impedance between signal and controller ground	Run/Crank Voltage	≥ 11.00 volts	20 failures out of 25 samples 250 ms / sample	Type C, No SVS Not "Special" Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump 2 Control Circuit High	P2634	Controller specific output driver circuit diagnoses the secondary/Transfer feed fuel pump 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 Ω impedance between signal and controller power	Run/Crank Voltage	≥ 11.00 volts	20 failures out of 25 samples 250 ms / sample	Type C, No SVS Not "Special" Type C Note: In certain controllers P2632 may also set (Fuel Pump 2 Control Open Circuit).

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 k) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow] m1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ ARC_ChkErr DTC] m2) CAN Sensor Bus message $0C3_Available m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_A RC_ChkErr DTC] n) Timer - Diagnostic Enable	j) <> Disabled Mode AND a8b) <> ZeroFlow Mode k) 0.05 grams/sec <= InstFuelFlow <= Max Allowed Flow [Supporting Table] **P2635 Max Fuel Flow** m1) <> TRUE m2) == TRUE m3) <> TRUE n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump 2 Flow Insufficient (For use on vehicles with dual fuel tanks and electric transfer pump)	P2636	This DTC detects if there is insufficient fuel flow from the secondary tank to the primary tank.	a) If Secondary fuel tank commanded transfer volume is b) and if Primary tank sensed volume change is c) while fuel transfer accumulated time is	a) = 5.00 liters b) >= 2.50 liters c) <= 1,000.00 seconds	a) Diagnostic Enabled b) Engine Operational State c) Secondary Tank Transfer Pump Commanded On e) Device Control Active f) Fuel volume in secondary tank g) Vehicle Speed Signal Faulted h) Vehicle Speed j) Communication Faults Active k) Transfer Pump Slosh Delay Timer [expired] l) Fuel Level Data Available	a) == True b) == Running c) == True e) <> True f) < 141 liters g) <> True h) < 0 MPH j) <> True k) >= 20.00 seconds l) == True	1,000 seconds [Secondary Tank Transfer Pump On Time Fail Lim]	Type C, No SVS Not "Special Type C"
			a) Secondary tank sensed fuel volume remains as b) while fuel transfer accumulated time is	a) > 141 liters b) >= 1,150.00 seconds	a) Diagnostic Enabled b) Engine Operational State c) Secondary Tank Transfer Pump Commanded On d) Device Control Active e) Indicated Fuel volume in secondary tank f) Vehicle Speed Signal Faulted g) Vehicle Speed h) Communication Faults Active j) Transfer Pump Slosh Delay Timer [expired] k) Fuel Level Data	a) == True b) == Running c) == True d) <> True e) > 141 liters f) <> True g) < 0 MPH h) <> True j) >= 20.00 seconds	1,150.00 seconds [Secondary Tank Transfer Pump On Lim]	

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

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	Detects an inoperative malfunction indicator lamp control circuit. This diagnostic reports the DTC when a short to ground is detected.	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between output 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	Detects an inoperative malfunction indicator lamp control circuit. This diagnostic reports the DTC when a short to power is detected.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between output 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.
Shared High Side Drive #2 Control Circuit Low (STG) - (GEN III Controllers ONLY)	P2670	Controller specific output driver circuit diagnoses the shared high sided driver # 2 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 output and controller ground	Shared high side drive #2 low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 6.00 = ON	5 failures out of 10 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.
Shared High Side Drive #2 Control Circuit High (STP) - (GEN III Controllers ONLY)	P2671	Controller specific output driver circuit diagnoses the shared high sided driver # 2 for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	- Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. - Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between output and controller power	Shared high side drive #2 diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 6.00 = ON	20 failures out of 25 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 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.
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.
Low Temperature Coolant Loop Pump Overspeed	P26FA	This DTC indicates a out of range high failure of the pump speed.	Actual pump speed	>= 4,500 rpm	Diagnostic enabled ****************************** Powertrain relay voltage Or WCP direct connected too Batt ****************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True ****************************** >= 11.0 Volts False ******************************	5 failures out of 8 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio	P279A	Monitor measured transfer case gear ratio is 4WD low ratio or neutral while the transfer case control module command state is 4WD high. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD low ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD high 4WD low ratio window ≤ 3.00 ≥ 2.40 neutral ratio window ≥ 1.30 ≤ 0.70 OR ≥ 3.00 ≤ 2.40 4WD low ratio window ≤ 2.90 ≥ 2.50	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	 ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 RPM ≥ 5.0 % ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 PRM ≥ 5.0 % ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccura te P057B, P057C, P057D, P057E P17D4, P279B, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail time ≥ 7.00 seconds out of sample time ≥ 10.00 seconds update rate 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio	P279B	Monitor measures transfer case gear ratio is 4WD high ratio or neutral while the transfer case control module command state is 4WD low. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD high ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD low 4WD high ratio window ≤ 1.30 ≥ 0.70 neutral ratio window ≥ 1.30 ≤ 0.70 OR ≥ 3.00 ≤ 2.40 4WD high ratio window ≤ 1.20 ≥ 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 RPM ≥ 5.0 % ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 PRM ≥ 5.0 % ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccurate P057B, P057C, P057D, P057E P17D4, P279A, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail time ≥ 7.00 seconds out of sample time ≥ 10.00 seconds update rate 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD neutral command not 4WD neutral ratio	P279C	Monitor measured transfer case gear ratio is 4WD high ratio or 4WD low ratio while the transfer case control module command state is 4WD neutral. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in 4WD high window AND measured transfer case ratio is in 4WD low ratio window or in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD neutral 4WD low ratio window ≤ 3.00 ≥ 2.40 4WD high ratio window ≥ 1.30 ≤ 0.70 4WD neutral ratio window ≤ 2.90 ≥ 2.50 OR ≤ 1.20 ≥ 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	≥ 300.0 RPM ≥ -20.0 Nm ≥ 0.0 RPM ≥ 0.0 % ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 PRM ≥ 5.0 % ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccurate P057B, P057C, P057D, P057E P17D4, P279A, P279B P0502, P0503, P0722, P0723, P2160, P2161	fail time ≥ 10.50 seconds out of sample time ≥ 15.00 seconds update rate 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 ≥ 0.00 volts ≤ 7.78 % ≥ 7.78 % 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 ≥ 0.00 volts ≥ 92.22 % ≤ 92.22 % 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.
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	> 3.92 [%] < -2.51 [%]	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**) 0 [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:	> 1.00 [s]		
					a. Engine speed in operating range	> 1,100 [rpm] < 2,000 [rpm]		
					b. EGR mass flow	< 1,000.00 [mg]		
					c. LPE position	< 0.00 [%]		
					e. Injected fuel quantity in operating range	> 20.00 [mm^3] < 50.00 [mm^3]		
					f. Air mass per cylinder in operating range	> 400.00 [mg] < 2,500.00 [mg]		
					g. Estimated O2 concentration in range	< 21.00 [%] > 0.00 [%]		
					Estimated O2 concentration stable i.e. difference between initial and actual value	< 1.00 [%]		
					Air mass flown since fuel cut-off condition	> 40.00 [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	> 4.60 [%] < -2.76 [%]	Engine running		EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRlb == FALSE		
					Sensor 1 is fully operative	OXY_O2_NOx1_PresCmpNotRlb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO)		
					DTC P2A00 is running	(see P2A00 Fault code)		
					Air mass flown since P2A00 is enabled	> 30.00 [g]		

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 Motor Overtemperature (ECB DC Motor)	P2AA5	This monitor checks if the temperature of the HP EGR cooler bypass DC-Motor increases too much (e.g. HP EGR cooler bypass 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]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Temperature Coolant Loop Pump Underspeed	P2BA0	This DTC indicates a out of range low failure of the pump speed.	Actual pump speed	< -100 rpm	Diagnostic enabled ***************************** Powertrain relay voltage Or WCP direct connected too Batt ***************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True ***************************** >= 11.0 Volts False *****************************	5 failures out of 8 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Delivery Performance Maximum Authority	P2BAA	This monitor detects a failure that causes RDP factor being at maximum authority.This monitor determines when RDP compensation has achieved the maximum authority without being able to achieve the expected pressure drop that guarantees proper reductant delivery performance.	Reductant Delivery Perfomance compensation factor	≥ 1.79	Closed loop of Reductant Delivery Performance Compensation running		10 fails out of 20 samples (100 ms/sample)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Temperature Coolant Loop Pump Preformance	P2C48	This DTC indicates a pump flow deviation failure. An expected phase current of the pump is superviced to detect any pump malfunction.	Absolute Pump AC (Phase) current error = (Actual pump speed refer to **PmpPerf: Tabel to estimate the expected pump AC current based on the pump speed.** in Supporting table) - Actual Pump AC current For more than	> 4.00 A > 5.00 sec	Diagnostic enabled **************************** Actual pump speed **************************** WCP_Current_OOR_FA **************************** Powertrain relay voltage Or LTL direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	False **************************** > 0 rpm **************************** = False **************************** >= 11.0 Volts False ****************************	5 failures out of 8 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Signal Message Counter Incorrect Bank 1 Sensor 1	P30B4	This DTC monitors for an error in communication with the Bank 1 Sensor 1 NOx Sensor Signal Message.	Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Oxygen Engine Out data over CAN bus is incorrect for	>= 8.00 counts	Message frame	= Is available	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000.00 milliseconds		
					Power Mode	= Run		
			out of total samples	>= 10.00 counts	Powertrain Relay Voltage	>= 11.00 Volts		
			Or		Run/Crank Ignition Voltage	>= 11.00 Volts		
			Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 1 data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 2 data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 3 data over CAN bus is incorrect for	>= 8.00 counts				
			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.
			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	>= 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 Bank 1 Sensor 2 NOx Sensor Signal Message.	Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Oxygen Post Catalyst data over CAN bus is incorrect for	>= 8.00 counts	Message frame	= Is available	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000.00 milliseconds		
					Power Mode	= Run		
			out of total samples	>= 10.00 counts	Powertrain Relay Voltage	>= 11.00 Volts		
			Or		Run/Crank Ignition Voltage	>= 11.00 Volts		
			Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Self Diagnostic Feedback Status 1 data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Self Diagnostic Result data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Lambda Binary Voltage Post Catalyst data over CAN					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Error Post Catalyst data over CAN bus is incorrect for	>= 8.00 counts				
			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.
Particulate Matter Sensor Control Module Status Signal Message Counter Incorrect	P30BC	This DTC monitors for an error in communication with the Particulate Matter Sensor Control Module Status Signal Message.	Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Regeneration Setpoint Temperature data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Control Unit Information data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Braking System Vehicle Top Speed Limit Request Type data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Transmission Neutral Locked Turbine Function Active 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	>= 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.
Low Temperature Coolant Loop Pump Speed Performance	P3196	This DTC indicates a pump speed performance failure. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0. When the On path fails, the off path is disabled until the ON path completes a OK cycle.	Absolut pump speed error =Abs(Desired pump speed - Actual Pump Speed) For mor than	> 2,000 rpm > 4.00 sec	Diagnostic enabled ***************************** Desired pump speed ***************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No CAC device control acitve - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True ***************************** > 0 rpm ***************************** >= 11.0 Volts False ****************************	5 failures out of 8 samples 1000ms / sample	
			Actual pump speed For more than	> 1,000 rpm > 7.00 sec	Diagnostic enabled Off Diagnostic enabled ***************************** WCP_SpeedOnFA ***************************** Desired pump speed ***************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No CAC device control acitve - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True False ***************************** = False ***************************** = 0 rpm ***************************** >= 11.0 Volts False ****************************	5 failures out of 8 samples 1000ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Temperature Coolant Loop Pump Motor Current Out Of Range High	P3198	This DTC indicates a out of range high failure of the pump motor current.	Actual Motor Current	> 10.00 A	Diagnostic enabled **************************** Actual pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True **************************** > 0 rpm **************************** >= 11.0 Volts False ****************************	5 failures out of 8 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Temperature Coolant Loop Pump Motor Current Out Of Range Low	P3199	This DTC indicates a out of range low failure of the pump motor current. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0.	Actual Motor Current For more than	< -0.50 A > 1.00 sec	Diagnostic enabled ***************************** Actual pump speed ***************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled- No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True ***************************** > 0 rpm ***************************** >= 11.0 Volts False ****************************	5 failures out of 8 samples 1000ms / sample	Type B, 2 Trips
			Actual Motor Current For more than	< -0.50 A > 1.00 sec	Diagnostic enabled ***************************** Actual pump speed ***************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True ***************************** = 0 rpm ***************************** >= 11.0 Volts False ****************************	5 failures out of 8 samples 1000ms / sample	

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 equals or exceeds before the sample time of is reached	5 counts (equivalent to 0.83 seconds) 0.83 seconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for Normal CAN transmission on Bus Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is present Otherwise: If power mode = Run/ Crank: Power Mode If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage	 > 15.00 milliseconds > 8.41 Volts >= 5.00 milliseconds Enabled 1.00 (1 indicates present) = Run >= 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.
					If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown impending Power Mode Battery voltage	 >= 9.00 Volts > 15.00 milliseconds > 8.41 Volts >= 6.41 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not crank >= 11.00 Volts		

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	 ≥ 10.00 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 10.00 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is present Battery voltage Sensor Bus Relay	 Not Active Not Active Not Active > 15.00 milliseconds > 8.41 Volts >= 0.40 milliseconds >= 5.00 milliseconds Enabled = False 1.00 (1 indicates present) > 11.00 Volts = On	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.
					Otherwise:			
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII:			
					Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD:			
					Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure:			
					Starter motor engaged for Or	> 15.00 milliseconds		
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure:			
					Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown impending Power Mode Battery voltage	1.00 (1 indicates enabled) OBD Controller = False = Not crank >= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the transfer case control module	Message is not received from controller for Message $1CB Message $1CC	 ≥ 10.00 seconds ≥ 0.50 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is present Battery voltage Sensor Bus Relay Otherwise:	 Not Active Not Active Not Active > 15.00 milliseconds > 8.41 Volts >= 0.40 milliseconds >= 5.00 milliseconds Enabled = False 1.00 (1 indicates present) > 11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	1.00 (1 indicates enabled) OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode Battery voltage	= Not crank >= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Glow Plug Control Module	U0106	This DTC monitors for a loss of communication with the Glow Plug Control Module	Message is not received from controller for Message $3BD	 ≥ 10.00 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is present Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/	 Not Active Not Active Not Active > 15.00 milliseconds > 8.41 Volts >= 0.40 milliseconds >= 5.00 milliseconds Enabled = False 1.00 (1 indicates present) > 11.00 Volts = On	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.
					Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Turbocharger Boost Control Module	U010C	This DTC monitors for a loss of communication with the Turbocharger Boost Control Module	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
			Message $099	≥ 10.00 seconds	If message is on Bus A: U0073	Not Active		
			Message $499	≥ 10.00 seconds	If message is on Bus B: U0074	Not Active		
					If message is on Bus S: U0076	Not Active		
					Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					Bus is enabled for	>= 0.40 milliseconds		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	1.00 (1 indicates enabled) OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode Battery voltage	= Not crank >= 11.00 Volts		

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		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $092	≥ 10.00 seconds	If message is on Bus A: U0073	Not Active		
			Message $4CC	≥ 10.00 seconds	If message is on Bus B: U0074	Not Active		
			Message $4CD	≥ 10.00 seconds				
			Message $4E5	≥ 10.00 seconds	If message is on Bus S: U0076	Not Active		
			Message $4E6	≥ 10.00 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message $4E7	≥ 10.00 seconds	Run/Crank ignition voltage	> 8.41 Volts		
			Message $4E8	≥ 10.00 seconds				
			Message $4E9	≥ 10.00 seconds	Bus is enabled for	>= 0.40 milliseconds		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	1.00 (1 indicates enabled) OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode	= Not crank		
					Battery voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Brake System Control Module	U0129	Detects that CAN serial data communication has been lost with the EBCM Transmission Control Module on GMLAN.	CAN messages are monitored continuously while GMLAN frames are being transmitted. Messages XXX and/or YYY, ...	=Undetected.	Controller On: Ignition: Non OBD Control Modules: Vehicle Power Mode condition: OBD Control Modules, e.g. ECM: Accessory Wake Up: Virtual Network condition: Bus off DTC U0073 U0129_00_ENABLE=	=True = Run or Crank or Accessory RUN Active Any Virtual Network that the module participates in is active. Not fault active Enabled	Depends on the CAN frame.	Depends on the node.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"
			Message $0F1	≥ 0.50 seconds	If message is on Bus A: U0073	Not Active		
			Message $12A	≥ 1.00 seconds	If message is on Bus B: U0074	Not Active		
			Message $1E1	≥ 0.50 seconds				
			Message $1F1	≥ 0.50 seconds	If message is on Bus S: U0076	Not Active		
			Message $1F3	≥ 10.00 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message $3C9	≥ 10.00 seconds	Run/Crank ignition voltage	> 8.41 Volts		
			Message $3CB	≥ 10.00 seconds				
					Bus is enabled for	>= 0.40 milliseconds		
			Message $3F1	≥ 10.00 seconds	The following criteria have been enabled for	>= 5.00 milliseconds		
			Message $451	≥ 0.50 seconds				
			Message $4D7	≥ 10.00 seconds	Normal CAN transmission on Bus	Enabled		
			Message $4E1	≥ 10.00 seconds				
			Message $4E9	≥ 10.00 seconds	Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode Battery voltage	= Not crank >= 11.00 Volts		

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: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is present Battery voltage Sensor Bus Relay Otherwise:	 Not Active Not Active Not Active > 15.00 milliseconds > 8.41 Volts >= 0.40 milliseconds >= 5.00 milliseconds Enabled = False 1.00 (1 indicates present) > 11.00 Volts = On	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.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode	= Not crank		
					Battery voltage	>= 11.00 Volts		

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	Communication failures equals or exceeds	3.00 counts	General Enable Criteria:		LIN bus communication executes in 500ms loop.	Type B, 2 Trips
					U1345	Not active this key cycle		
					Subnet configuration not used Or Device is calibrated as present	1.00 (0 indicates not used) 33,280.00		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal LIN transmission on Bus	Enabled		
					Controller not in programming mode			
					If UCAP is present on bus, starter motor is not engaged	0.00 (1 indicates present)		
					Power mode And Run/Crank ignition voltage Or Battery voltage	= Run >= 11.00 Volts >= 11.00 Volts		
					And the following criteria have been enabled for	>= 400.00 milliseconds		
					LIN bus is awake			
					Power mode Or If controller is a non-OBD controller: LIN communications enabled during cranking	= Run or accessory 0.00 (1 indicates enabled)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power mode Controller type: OBD Controller	= Crank		

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 B	U0285	This DTC monitors for a loss of communication on the LIN bus with Shutter Module B	Communication failures equals or exceeds	3.00 counts	General Enable Criteria:		LIN bus communication executes in 500ms loop.	Type B, 2 Trips
					U1345	Not active this key cycle		
					Subnet configuration not used Or Device is calibrated as present	1.00 (0 indicates not used) 33,280.00		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal LIN transmission on Bus	Enabled		
					Controller not in programming mode			
					If UCAP is present on bus, starter motor is not engaged	0.00 (1 indicates present)		
					Power mode And Run/Crank ignition voltage Or Battery voltage	= Run >= 11.00 Volts >= 11.00 Volts		
					And the following criteria have been enabled for	>= 400.00 milliseconds		
					LIN bus is awake			
					Power mode Or If controller is a non-OBD controller: LIN communications enabled during cranking	= Run or accessory 0.00 (1 indicates enabled)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power mode Controller type: OBD Controller	= Crank		

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 NOx Sensor A.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0B0	≥ 0.50 seconds	If message is on Bus A: U0073	Not Active		
			Message $0B1	≥ 0.50 seconds	If message is on Bus B: U0074	Not Active		
			Message $0B5	≥ 10.00 seconds				
			Message $0B7	≥ 10.00 seconds	If message is on Bus S: U0076	Not Active		
			Message $289	≥ 0.50 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message $591	≥ 10.00 seconds	Run/Crank ignition voltage	> 8.41 Volts		
					Bus is enabled for	>= 0.40 milliseconds		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode Battery voltage	= Not crank >= 11.00 Volts		

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 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	≥ 0.50 seconds	If message is on Bus A: U0073	Not Active		
			Message $0B2	≥ 0.50 seconds	If message is on Bus B: U0074	Not Active		
			Message $0B6	≥ 10.00 seconds				
			Message $0B8	≥ 10.00 seconds	If message is on Bus S: U0076	Not Active		
			Message $28B	≥ 0.50 seconds	Starter motor engaged for	> 15.00 milliseconds		
					Or			
			Message $592	≥ 10.00 seconds	Run/Crank ignition voltage	> 8.41 Volts		
					Bus is enabled for	>= 0.40 milliseconds		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode Battery voltage	= Not crank >= 11.00 Volts		

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		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
			Message $3A3	≥ 10.00 seconds	If message is on Bus A: U0073	Not Active		
			Message $3A5	≥ 10.00 seconds	If message is on Bus B: U0074	Not Active		
			Message $3A9	≥ 10.00 seconds				
			Message $3AB	≥ 10.00 seconds	If message is on Bus S: U0076	Not Active		
			Message $497	≥ 10.00 seconds	Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					Bus is enabled for	>= 0.40 milliseconds		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode	= Not crank		
					Battery voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss Of Communication with Low Temperature Coolant Loop Pump	U062F	This DTC monitors for a loss of communication on the LIN bus with the Low Temperature Coolant Loop Pump	Communication failures equals or exceeds	3.00 counts	General Enable Criteria: U1345 Subnet configuration not used Or Device is calibrated as present The following criteria have been enabled for Normal LIN transmission on Bus Controller not in programming mode If UCAP is present on bus, starter motor is not engaged Power mode And Run/Crank ignition voltage Or Battery voltage And the following criteria have been enabled for LIN bus is awake Power mode Or If controller is a non-OBD controller: LIN communications enabled during cranking	 Not active this key cycle 1.00 (0 indicates not used) 33,280.00 >= 5.00 milliseconds Enabled 0.00 (1 indicates present) = Run >= 11.00 Volts >= 11.00 Volts >= 400.00 milliseconds = Run or accessory 0.00 (1 indicates enabled)	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.
					Power mode Controller type: OBD Controller	= Crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Diesel Intake Air Flow "A" Position Sensor	U0654	This monitor checks if the Throttle position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO message fault on Throttle SENT position == TRUE OR	 > 6.25 [ms] AND == STEADY LOW > 6.25 [ms] AND == STEADY HIGH message error==TRUE OR	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	== 1.00 > 11.00 [V]	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.
			(					
			number of Throttle SENT position counters has been updated	-------------				
			AND	AND				
			HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE)	> 6.25 [ms]				
			)					
			)					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Zone Module Configuration Error	U101A	FTZM Pump Control Configuration Management provides a method for a Diagnostic and Emissions-Critical Electronic Control Unit (DEC ECU) to communicate configuration information to an OBD Smart Device (SD); in this case the FTZM. The FTZM contains pre-loaded sets of calibrations, each of which specifies proper tuning values for electronic commutation of corresponding fuel pump motor variants including a default value that denotes a non-operational [factory default] pump variant. This configuration management feature provides a method to reduce the number of FTZM end-item part numbers. The Configuration Error Diagnostic runs every 100ms to verify that a calibration index value is present that is not the factory default value. When the diagnostic identifies that the default index value is loaded, the	FTZM Fuel Pump Configuration Calibration Index Value	= Factory Default Index Value OR = Not Configured Index Value [device failed to accept calibration value on 1st wake-up]	a] Diagnostic enabled; b] Device feedback Faulted; c] Diagnostic system disabled; d] CAN serial data message $3C8 received	a] = 1.00 [1=TRUE; 0 <> True] b] <> True; c] <> True; d] = TRUE	6.00 failures of 8.00 samples ; 100 millisec / sample	Type B, 2 Trips

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

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.
Lost Communication With Fuel Pump Driver Control Module on Bus B	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus B.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
			Message $0D5	≥seconds	If message is on Bus A: U0073	Not Active		
			Message $0D7	≥seconds	If message is on Bus B: U0074	Not Active		
					If message is on Bus S: U0076	Not Active		
					Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					Bus is enabled for	>= 0.40 milliseconds		
					The following criteria have been enabled for	>= 5.00 milliseconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Sensor bus relay is present	1.00 (1 indicates present)		
					Battery voltage	> 11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	1.00 (1 indicates enabled) OBD Controller		
					Controller shutdown impending	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode	= Not crank		
					Battery voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug Control Module Lost Communication with Engine Control Module	U18C8	This DTC monitors for a Glow Plug Control Module loss of communication with the Engine Control Module.	The GPCM Diagnostic Status Message signal in GMLAN frame $3BD from the GPCM has a value of : for the Diagnostic Status signal.	CeDFIR_e_GlowPlugCMLostCommECM	General Enable Criteria: Message $3BD U18C8 Glow Plug Control Module	 Is being received Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
50	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	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
5	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
10	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
15	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
20	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
25	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
30	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
35	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
40	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
45	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
50	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
55	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
60	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
65	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
70	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
75	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
80	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
90	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
100	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
5	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
10	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
15	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
20	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
25	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
30	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
35	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
40	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
45	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
50	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
55	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
60	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
65	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
70	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
75	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
80	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
90	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
100	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510

Initial Supporting table - DPF_ResistFlowDsblHi

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF_ResistFlowDsblLo

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	10	20	30	40	50	60	70	80
1	1	1	1	1	1	1	1	1

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqMaxThreshold

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_FuelReqMinThrsh

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
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	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,199.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,200.0	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	15.0	20.0	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	15.0	20.0	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 - EGT4 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT4 Dynamic Check.

y/x	0.0	15.0	20.0	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 - EGT5 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT5 Dynamic Check.

y/x	0.0	15.0	20.0	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 - EnginePointEnable_DPF_TempDeviation

Description:

y/x	950	1,000	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
60	0	1	1	1	1	1	1	1

Initial Supporting table - EnginePointEnable_HC_TempDeviation

Description:

y/x	950	1,000	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_b_CB_EnblCMBR

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

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_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	1	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	1	1	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	1	0	0	

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	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

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	0	0	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	214	122	90	90	90

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	-214	-122	-90	-80	-80

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	1

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	1	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	1	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	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	1	0	1	1

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	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

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

KaOXYD_b_NOx2SigRngEnblCmbMode - 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	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	1	0	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - 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	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	

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	173	173	173	173	173

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	800	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250
1	30	40	40	60	60	100	110	110	80	80	80	70

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-12	-13	-12	-15	-18	-21	-23	-28	-30	-33
700	-12	-13	-14	-16	-18	-21	-23	-28	-30	-33
950	-12	-13	-16	-18	-19	-21	-23	-28	-30	-33
1,200	-12	-13	-17	-20	-22	-23	-24	-29	-30	-33
1,450	-12	-13	-17	-20	-23	-25	-26	-31	-32	-34
1,700	-12	-13	-17	-20	-23	-26	-30	-33	-34	-35
1,950	-12	-13	-17	-20	-23	-26	-30	-35	-36	-38
2,200	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41
2,800	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41
3,200	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41

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	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	190	190	190	190	190

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	-120	-80	-70	-69	-40	0	40	41	42	60	75
-120	0	0	0	0	0	0	0	0	0	0	0
-78	0	0	0	0	0	0	0	0	0	0	0
-77	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - NOX_NOx1_IncrDynCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor dynamic check in increasing direction

NOX_NOx1_IncrDynCmbMode - 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_NOx1_IncrDynCmbMode - 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_NOx1_IncrDynCmbMode - 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_NOx1_IncrDynCmbMode - 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_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	1	1	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	1	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	1	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	1	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	1	1	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	1	1	1	1	

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	1	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	1	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	1	1	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	1	1	1	1	

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	1	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	1	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	1	1	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	1	1	1	1	

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	1	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	1	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	1	1	

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	1	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	1	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	1	1	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	1	1	1	1	

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	1	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	1	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	1	1	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	1	1	1	1	

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	20	25	30	35	40	45	50	55
1	25	30	34	37	40	42	44	46

Initial Supporting table - 1st_FireAftrMisfr_Acel

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	0.69	1.21	0.93	1.08	0.71	1.12	1.29	1.39	2.64	1.91	1.94	1.37	0.62	1.17	0.84	0.61	0.68
8	0.67	0.91	0.68	0.92	0.89	1.14	1.57	1.69	3.02	2.06	1.78	1.43	0.86	1.00	0.87	0.47	0.67
12	0.60	0.83	0.49	0.66	0.97	1.25	1.56	1.62	2.66	2.00	1.75	1.45	1.26	1.05	0.73	0.68	0.80
18	0.50	0.72	0.39	0.45	0.72	0.85	1.13	1.49	2.64	1.90	1.67	1.30	1.41	0.97	0.87	0.72	0.80
22	0.49	0.70	0.36	0.38	0.65	0.75	0.87	1.46	2.57	1.78	1.63	1.23	1.33	0.95	0.94	0.73	0.78
24	0.49	0.74	0.35	0.36	0.62	0.72	0.80	1.39	2.55	1.71	1.54	1.21	1.30	0.98	0.95	0.75	0.79
30	0.48	0.72	0.32	0.31	0.59	0.65	0.65	1.24	2.26	1.63	1.43	1.11	1.24	0.96	0.98	0.79	0.82
60	0.46	0.77	0.27	0.23	0.50	0.53	0.45	0.94	1.70	1.29	1.18	0.92	1.16	0.96	1.01	0.86	0.83
98	0.47	0.76	0.25	0.20	0.48	0.49	0.44	0.85	1.54	1.17	1.09	0.86	1.12	0.92	1.02	0.89	0.82

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	-1.24	-1.41	-1.22	-1.51	-1.10	-1.24	-0.66	-0.58	-0.33	-0.50	-0.14	-0.20	-0.48	-0.50	-0.23	-0.40	-0.27
8	-0.77	-0.84	-0.85	-0.90	-1.24	-1.00	-1.39	-0.80	-0.94	-0.85	-0.18	-0.27	-0.69	-0.65	-0.29	-0.48	-0.39
12	-0.68	-0.80	-0.79	-0.78	-1.29	-1.18	-1.54	-1.16	-1.50	-1.03	-0.14	-0.52	-0.90	-0.81	-0.55	-0.68	-0.65
18	-0.62	-0.75	-0.78	-0.68	-1.41	-1.36	-1.78	-1.03	-1.45	-1.21	-0.38	-0.40	-0.91	-0.95	-0.45	-0.96	-0.77
22	-0.61	-0.71	-0.72	-0.65	-1.38	-1.40	-1.89	-1.00	-1.50	-1.27	-0.91	-0.75	-0.93	-1.00	-0.60	-1.07	-0.88
24	-0.60	-0.71	-0.71	-0.63	-1.38	-1.37	-1.90	-1.05	-1.50	-1.31	-0.95	-0.78	-0.90	-1.04	-0.82	-1.10	-0.89
30	-0.58	-0.70	-0.70	-0.61	-1.42	-1.43	-1.98	-1.21	-1.60	-1.38	-1.03	-0.80	-0.93	-1.09	-0.89	-1.17	-0.97
60	-0.55	-0.69	-0.68	-0.56	-1.44	-1.41	-2.25	-1.42	-1.73	-1.55	-1.20	-0.85	-0.98	-1.22	-1.08	-1.42	-1.17
98	-0.54	-0.69	-0.67	-0.54	-1.47	-1.43	-2.33	-1.55	-1.78	-1.63	-1.27	-0.90	-1.00	-1.25	-1.16	-1.54	-1.26

Initial Supporting table - 1stFireAfterMisJerkAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - 1stFireAftrMisAcelAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - Abnormal Cyl Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Abnormal Rev Mode

Description: Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - Abnormal SCD Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	50	50	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	68	55	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	47	47	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	65	52	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	60	60	60	60	60	60	60	60

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	160	160	160	160	160	160	160	160

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	50	50	50	50	50	50	50	50

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	150	150	150	150	150	150	150	150

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in 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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in SCR temp 1 or DeSOx lean mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

y/x	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - Bank_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
6	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
98	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting table - Bank_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	1.00	1.20	1.00	1.00	1.00	1.21	1.00	1.00	1.00	1.00	2.06	0.87	0.92	0.89	1.00	0.87	0.95
6	0.72	0.75	0.75	0.79	0.83	1.03	1.23	1.12	1.00	1.00	2.19	1.00	0.96	0.88	1.00	0.90	1.00
8	0.60	0.60	0.58	0.57	0.72	0.91	1.01	1.00	1.00	0.94	1.94	1.05	0.95	0.93	1.13	0.95	1.07
12	0.31	0.42	0.32	0.41	0.66	0.76	1.02	1.00	1.00	0.95	1.28	0.83	0.87	0.76	0.77	0.84	1.00
16	0.41	0.38	0.29	0.38	0.53	0.48	0.86	1.00	1.00	0.91	0.92	0.72	0.70	0.57	0.59	0.70	0.79
24	0.60	0.40	0.32	0.38	0.44	0.40	0.57	1.01	1.00	0.78	1.01	0.63	0.53	0.51	0.50	0.50	0.67
40	0.71	0.41	0.32	0.38	0.37	0.35	0.40	0.88	1.00	0.68	0.94	0.70	0.48	0.48	0.53	0.42	0.51
60	0.78	0.41	0.31	0.37	0.35	0.35	0.35	0.82	1.00	0.57	0.82	0.55	0.41	0.45	0.52	0.36	0.46
98	0.83	0.42	0.31	0.38	0.34	0.34	0.32	0.77	1.00	0.50	0.77	0.49	0.35	0.42	0.53	0.31	0.39

Initial Supporting table - BankCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	1.00	1.00	1.00	1.28	1.00	1.00	1.00	1.13	1.00	1.00	2.23	1.39	1.21	1.23	1.08	1.04	1.14
6	1.00	0.85	0.81	0.81	1.00	1.00	1.00	1.25	1.00	0.95	2.08	1.41	1.26	1.26	1.08	1.09	1.20
8	1.05	0.86	0.82	0.78	1.00	1.10	1.00	1.30	1.00	0.98	1.80	1.42	1.23	1.35	1.14	1.14	1.28
12	1.01	0.73	0.69	0.74	0.95	1.00	1.00	1.28	1.00	0.80	1.12	1.00	1.00	0.89	1.15	1.00	1.35
16	1.12	0.72	0.67	0.72	0.97	0.80	1.00	0.90	1.00	0.71	0.81	1.00	0.72	0.73	0.86	0.96	1.15
24	1.25	0.69	0.58	0.71	0.95	0.65	1.00	0.78	1.00	0.67	0.71	0.80	0.58	0.60	0.69	0.80	0.85
40	1.31	0.66	0.55	0.71	0.96	0.95	1.00	0.71	1.00	0.65	0.77	0.66	0.51	0.47	0.56	0.63	0.66
60	1.32	0.65	0.53	0.70	0.97	1.00	1.00	0.67	1.00	0.64	0.83	0.58	0.47	0.42	0.49	0.52	0.51
98	1.36	0.65	0.51	0.69	0.99	1.00	1.00	0.63	1.00	0.63	0.83	0.54	0.46	0.35	0.43	0.42	0.38

Initial Supporting table - Cat2_CrtdEffThrsh

Description: Minimum Second Catalyst (UF DOC) conversion efficiency threshold (fault threshold) as function of ambient temperature [K]

y/x	250	266	282	298	314	330
1	9	9	9	9	9	9

Initial Supporting table - Cat2_CrtdMaxFuel

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

y/x	250	266	282	298	314	330
1	180	180	180	180	180	180

Initial Supporting table - Cat2CrtdEffRepEWMA

Description: Minimum Second Catalyst (UF DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Second Catalyst EWMA filter enabled and Second Catalyst conversion inefficiency previously detected (Second Catalyst FA = TRUE)

y/x	250	266	282	298	314	330
1	1	1	1	1	1	1

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Value Units: percent misfire over 200 revolutions (%)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
10	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
20	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
30	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
40	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
50	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
60	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
70	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
80	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
90	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
100	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0

Initial Supporting table - CatCrtdEffRepEWMA

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Catalyst EWMA filter enabled and Catalyst conversion inefficiency previously detected (Catalyst FA = TRUE)

y/x	250	266	282	298	314	330
1	1	1	1	1	1	1

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	340
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	150	150	150	150	150	150

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider.   Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ClyBeforeAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1

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

CombustModeIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - ConsecCylModDecel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	2.30	1.97	2.75	1.70	2.02	2.05	1.63	1.84	1.87	1.33	2.15	2.30	1.96	2.39	1.58	1.13	1.05
6	1.06	1.09	1.64	1.65	1.45	1.54	1.59	1.90	2.24	1.26	1.94	2.32	1.79	2.31	1.65	1.14	1.12
8	1.23	1.00	1.42	1.68	1.22	1.23	1.06	1.37	1.49	1.27	1.53	2.52	1.73	2.29	1.73	1.16	1.20
12	1.43	1.10	1.15	1.65	1.38	1.41	1.00	0.94	1.05	1.33	1.03	1.55	1.35	1.05	1.00	0.95	1.07
16	1.49	1.15	1.16	1.51	1.22	1.14	0.99	1.04	0.95	1.30	0.96	1.10	1.03	0.73	0.72	0.70	0.74
24	1.54	1.17	1.18	1.39	1.12	0.98	0.77	1.05	0.95	1.13	1.19	0.90	0.89	0.60	0.92	0.80	0.80
40	1.58	1.18	1.13	1.28	1.04	0.88	0.63	0.92	0.95	1.00	1.17	0.69	0.88	0.65	1.07	1.38	1.46
60	1.62	1.18	1.10	1.23	1.00	0.84	0.60	0.84	0.90	0.87	1.16	0.59	0.85	0.68	1.09	1.65	1.90
98	1.66	1.19	1.09	1.19	0.97	0.81	0.60	0.78	0.89	0.79	1.15	0.53	0.82	0.69	1.12	1.89	2.22

Initial Supporting table - ConsecCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	-1	-1	-1	-1	-4	-1	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1
6	-1	-1	0	0	-3	-1	-1	-3	-2	-2	-1	-1	-1	-1	-1	-1	-1
8	0	0	0	0	-2	-1	-2	-3	-3	-2	-1	-1	-1	-1	-1	-1	-1
12	0	0	0	0	-1	-1	-2	-3	-4	-2	-1	-1	-1	-1	-1	-1	-1
16	0	0	0	0	0	-1	-2	-2	-4	-3	-2	-1	-1	-1	-1	-1	-1
24	0	0	0	0	0	-1	-3	-2	-4	-3	-2	-1	-1	-1	-1	-1	-1
40	0	0	0	0	1	-1	-3	-2	-5	-4	-2	-1	-1	-1	-1	-1	-1
60	0	0	0	0	1	-1	-4	-2	-5	-4	-2	-1	-1	-1	-1	-1	-1
98	0	0	0	0	1	-1	-4	-2	-5	-4	-2	-1	-1	-1	-1	-1	-1

Initial Supporting table - ConsecSCD_Decel

Description: Used for P0300 - P0308, Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecSCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider.   Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - CylBeforeAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylModeDecel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

CylModeDecel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,416	927	621	380	255	190	158	148	83	39	32	18	19
2	1,014	689	483	304	207	166	123	118	65	36	29	18	19
4	562	411	312	212	150	133	98	78	47	31	23	17	17
6	1,157	734	469	288	185	132	98	78	35	26	17	16	16
8	1,445	919	580	375	230	167	106	83	47	31	23	17	16
10	2,224	1,341	824	465	296	199	111	91	55	33	27	18	18
12	2,950	1,793	1,093	630	428	263	132	96	58	40	30	20	20
14	3,638	2,236	1,357	796	542	327	173	129	70	44	31	22	22
16	4,118	2,672	1,619	962	655	391	214	159	84	48	33	24	24
18	4,628	3,114	1,887	1,127	751	455	256	189	100	53	36	26	26
20	5,127	3,486	2,146	1,294	852	520	297	218	125	56	38	29	28
22	5,630	3,844	2,416	1,458	960	584	338	248	145	61	41	32	30
24	6,153	4,206	2,678	1,624	1,079	647	379	278	167	68	44	35	34
30	7,666	5,265	3,471	2,123	1,467	839	503	367	230	88	56	42	42
40	10,220	7,063	4,795	2,949	2,076	1,160	709	515	349	126	77	56	57
60	15,311	10,618	7,314	4,604	3,270	1,802	1,122	813	547	198	122	90	86
97	20,000	17,308	11,972	7,711	5,562	3,005	1,895	1,369	903	334	201	150	139

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	19	15	12	11	13	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
2	18	14	10	11	13	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
4	15	13	9	10	12	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
6	13	12	8	9	11	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
8	11	11	7	8	10	8	32,766	32,768	32,768	32,768	32,768	32,768	32,768
10	13	12	8	9	9	7	32,766	32,768	32,768	32,768	32,768	32,768	32,768
12	15	12	11	11	10	8	32,766	32,768	32,768	32,768	32,768	32,768	32,768
14	18	14	13	13	11	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
16	20	15	15	15	12	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
18	22	16	17	15	13	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
20	24	19	19	17	14	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeDecel

22	27	21	21	17	15	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
24	29	24	23	19	16	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
30	38	31	29	23	19	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
40	52	43	38	30	24	18	32,766	32,768	32,768	32,768	32,768	32,768	32,768
60	83	68	58	46	35	24	32,766	32,768	32,768	32,768	32,768	32,768	32,768
97	139	115	97	74	54	37	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usec)
Y Units: percent load of max indicated torque (%)

CylModeJerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,154	761	500	325	222	185	95	119	64	64	40	31	26
2	931	618	409	271	181	143	74	81	62	54	33	27	24
4	755	490	323	196	135	95	62	47	58	40	26	23	22
6	808	565	517	327	234	161	74	58	54	38	20	19	20
8	1,481	949	736	443	330	224	106	75	59	40	25	21	20
10	2,258	1,437	943	572	407	293	139	101	62	41	29	24	22
12	2,572	1,735	1,168	809	543	361	170	124	76	48	30	30	25
14	2,972	2,028	1,370	936	627	423	201	149	89	62	36	35	26
16	3,355	2,313	1,591	1,106	729	493	229	178	96	77	45	39	32
18	3,741	2,600	1,807	1,329	850	560	260	199	104	87	53	43	36
20	4,144	2,888	2,016	1,488	976	622	295	221	111	96	61	48	40
22	4,535	3,175	2,238	1,649	1,114	688	328	251	121	102	66	52	44
24	4,920	3,457	2,451	1,814	1,226	757	360	279	129	109	72	56	48
30	6,120	4,333	3,099	2,329	1,565	952	451	359	156	131	89	68	59
40	8,096	5,770	4,181	3,174	2,132	1,276	616	502	196	162	119	87	78
60	12,070	8,663	6,347	4,944	3,266	1,938	926	785	278	232	176	127	116
97	19,526	14,083	10,393	8,096	5,384	3,194	1,498	1,296	436	351	284	200	186

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	24	16	16	16	14	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
2	23	16	15	15	14	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
4	21	15	13	13	13	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
6	19	14	12	12	12	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
8	17	13	10	11	11	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
10	19	14	12	9	10	8	32,766	32,768	32,768	32,768	32,768	32,768	32,768
12	21	15	14	11	11	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
14	20	18	15	13	11	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
16	22	20	17	14	12	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
18	29	23	19	16	13	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
20	33	25	20	17	13	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

22	37	27	22	18	14	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
24	40	30	24	20	15	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
30	52	37	29	24	18	16	32,766	32,768	32,768	32,768	32,768	32,768	32,768
40	69	47	37	30	22	19	32,766	32,768	32,768	32,768	32,768	32,768	32,768
60	107	70	53	42	30	27	32,766	32,768	32,768	32,768	32,768	32,768	32,768
97	169	112	86	66	46	40	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - DeacCylInversionDecel

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Delta time per cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - DeacCylInversionJerk

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong"   If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Change in Delta time per cylinder from last cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	5,200	5,200	5,200	5,200	5,200	5,200	2,550

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	2,350	5,200	5,200	5,200	5,200	5,200	

Initial Supporting table - InfrequentRegen

Description: Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matchs a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - 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	0	236	237	244	245	246	250	270	315	320	325	330	340	360	400
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	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
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
75	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
80	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
90	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
100	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
200	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
250	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	200	250	275	300	325	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	200	250	275	300	325	350	400	450
1	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - m_NH3_StrgMaxThrsh

Description: Upper boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	250	275	300	325	350	400	450
1	2	2	2	2	2	2	2	2

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	250	275	300	325	350	400	450
1	1	1	1	1	1	1	1	1

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	230	275	276	425
1	0	0	0	0

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

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

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	1	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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	115	120	125	130	135	140	140	140

Initial Supporting table - P0101: Manifold pressure Low limit in Overrun

Description: Intake manifold pressure low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	70	70	70	70	70	70	70	70

Initial Supporting table - P0101: Pulsation Map

Description: Adjustment of the air mass flow measured by the MAF sensor for flow distribution and pulsations. It is function of engine speed (X axis) and fuel request (Y axis)

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,020	3,200	3,400	3,600
0	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
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
130	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
140	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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	100	100	100	100	100	100	100	100

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	0	0	0	0	0	0	0	0

Initial Supporting table - P0234, P0299: Boost pressure control deviation enabling

Description: Calibration map for the enabling of boost pressure control deviation monitoring, function of combustion mode.

Value Units: boolean

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	1	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	1	1	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	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	220	220	220	220

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	176	164	150	150

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

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	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

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	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,200
1	1	1	1	1	1	1	0	0	0	0

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	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	150	160	170	180

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	84	94	104	114

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	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

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	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

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	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
1	2	2	2	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	1	1	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	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

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	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

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	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

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	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

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	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

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	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

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	580	600	620	640	720	780	880	950
6	-80	-80	-80	-80	-80	-200	-240	-280
8	-80	-80	-80	-80	-80	-200	-240	-280
10	-80	-80	-80	-80	-80	-200	-240	-280
12	-80	-80	-80	-80	-80	-200	-240	-280
18	-80	-80	-80	-80	-80	-200	-240	-280
24	-80	-80	-80	-80	-80	-200	-240	-280
30	-200	-200	-200	-200	-200	-200	-240	-280
36	-224	-224	-224	-224	-224	-224	-240	-280
40	-240	-240	-240	-240	-240	-240	-240	-280

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	580	600	620	640	720	780	880	950
6	-144	-144	-144	-144	-144	-184	-200	-248
8	-144	-144	-144	-144	-144	-184	-200	-248
10	-144	-144	-144	-144	-144	-184	-200	-248
12	-144	-144	-144	-144	-144	-184	-200	-248
18	-144	-144	-144	-144	-144	-184	-232	-272
24	-144	-144	-144	-144	-144	-192	-240	-280
30	-192	-192	-192	-192	-192	-200	-240	-280
36	-224	-224	-224	-224	-224	-224	-240	-280
40	-240	-240	-240	-240	-240	-240	-240	-280

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	580	600	620	640	720	780	880	950
6	-144	-144	-144	-144	-144	-184	-200	-248
8	-144	-144	-144	-144	-144	-184	-200	-248
10	-144	-144	-144	-144	-144	-184	-200	-248
12	-144	-144	-144	-144	-144	-184	-200	-248
18	-144	-144	-144	-144	-144	-184	-232	-272
24	-144	-144	-144	-144	-144	-192	-240	-280
30	-192	-192	-192	-192	-192	-200	-240	-280
36	-224	-224	-224	-224	-224	-224	-240	-280
40	-240	-240	-240	-240	-240	-240	-240	-280

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	579	580	999	1,000	1,500	1,501	1,600	1,601
50	-256	40	40	40	40	-256	-256	-256
55	-256	40	40	40	40	-256	-256	-256
60	-256	40	40	40	40	-256	-256	-256
65	-256	40	40	40	40	-256	-256	-256
70	-256	40	40	40	40	-256	-256	-256
75	-256	40	40	40	40	-256	-256	-256
80	-256	40	40	40	40	-256	-256	-256
85	-256	40	40	40	40	-256	-256	-256
90	-256	40	40	40	40	-256	-256	-256
100	-256	40	40	40	40	-256	-256	-256
110	-256	40	40	40	40	-256	-256	-256

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	579	580	999	1,000	1,500	1,501	1,600	1,601
50	256	5	5	5	5	256	256	256
55	256	5	5	5	5	256	256	256
60	256	5	5	5	5	256	256	256
65	256	5	5	5	5	256	256	256
70	256	5	5	5	5	256	256	256
75	256	5	5	5	5	256	256	256
80	256	5	5	5	5	256	256	256
85	256	5	5	5	5	256	256	256
90	256	5	5	5	5	256	256	256
100	256	5	5	5	5	256	256	256
110	256	5	5	5	5	256	256	256

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	579	580	999	1,000	1,500	1,501	1,600	1,601
50	52	52	52	52	52	52	52	52
55	52	52	52	52	52	52	52	52
60	52	52	52	52	52	52	52	52
65	52	52	52	52	52	52	52	52
70	52	52	52	52	52	52	52	52
75	52	52	52	52	52	52	52	52
80	52	52	52	52	52	52	52	52
85	52	52	52	52	52	52	52	52
90	52	52	52	52	52	52	52	52
100	52	52	52	52	52	52	52	52
110	52	52	52	52	52	52	52	52

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
2,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
3,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
4,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
5,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
6,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
7,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0

Initial Supporting table - P129F Threshold Low

Description: P129F Filtered Fuel Pump Speed Error Low Threshold [under-performing motor]
Instantaneously calculated filtered pump speed error measured is lower than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
2,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
3,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
4,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
5,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
6,000.0	1,750.0	1,750.0	1,750.0	1,750.0	1,750.0
7,000.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0

Initial Supporting table - 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	1	1	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	70	83	96
1	2	1	2

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	70	83	96
1	2	2	2

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	30	50	70
-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	30	50	70
-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 - P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling

Description: Maximum allowed HP EGR filtered flow as a function of ambient air temperature to enable HP EGR cooler efficiency diagnostic.

Value Units: g/s
X Unit: deg C

y/x	1	2	3	4	5	6
1	80	80	80	80	80	80

Initial Supporting table - P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling

Description: Minimum allowed HP EGR filtered flow as a function of ambient air temperature to enable HP EGR cooler efficiency diagnostic.

Value Units: g/s
X Unit: deg C

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

Initial Supporting table - P2457: Minimum time for HP EGR cooler efficiency monitor enabling

Description: Minimum allowed time as a function of HP EGR filtered flow to run HP EGR cooler efficiency diagnostic once that all HP EGR flow enabling conditions are reached.

Value Units: s
X Unit: g/s

y/x	0	20	40	60	80	100
1	8	8	7	6	5	4

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	130	180	230
2	40	40	40	40	40	40	130	180	230
3	40	40	40	40	40	40	130	180	230
5	40	40	40	40	40	40	130	180	230
6	40	40	40	40	40	40	130	180	230
8	40	40	40	40	40	40	130	180	230
9	40	40	40	40	40	40	130	180	230
11	40	40	40	40	40	40	130	180	230
12	40	40	40	40	40	40	130	180	230
14	40	40	40	40	40	40	130	180	230
15	40	40	40	40	40	40	130	180	230
17	40	40	40	40	40	40	130	180	230
18	40	40	40	40	40	40	130	180	230
20	40	40	40	40	40	40	130	180	230
21	40	40	40	40	40	40	130	180	230
23	40	40	40	40	40	40	130	180	230
24	40	40	40	40	40	60	130	180	230
26	40	40	40	40	40	60	130	180	230
27	40	40	40	40	40	60	130	180	230
29	40	40	40	40	40	60	130	180	230
30	40	40	40	40	40	60	130	180	230
32	40	40	40	40	40	60	130	180	230
33	40	40	40	40	40	60	130	180	230
35	40	40	40	40	40	60	130	180	230
36	40	40	40	40	40	60	130	180	230
38	40	40	40	40	40	60	130	180	230
39	40	40	40	40	40	60	130	180	230
41	40	40	40	40	40	60	130	180	230
42	40	40	40	40	40	60	130	180	230
44	40	40	40	40	40	60	130	180	230
45	40	40	40	40	40	60	130	180	230

Initial Supporting table - P2635 Threshold High

47	40	40	40	40	40	60	130	180	230
48	40	40	40	40	40	60	130	180	230

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
5	-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 - Pair_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	1.90	1.80	2.27	1.71	1.19	1.25	1.30	1.39	1.80	1.82	1.59	1.63	1.50	1.94	2.32	1.83	2.21
6	0.81	1.20	1.04	0.90	0.91	1.14	1.58	1.27	1.85	1.52	1.39	1.60	1.33	1.75	2.18	1.57	2.06
8	0.95	1.03	1.27	1.16	0.86	1.07	1.23	1.60	1.33	1.42	1.34	1.50	0.95	1.57	1.40	1.25	1.87
12	0.87	1.18	1.18	1.22	0.90	0.99	1.20	1.70	1.49	1.70	1.30	1.00	0.85	0.95	0.80	0.75	1.13
16	0.83	1.01	1.10	1.20	0.69	0.60	0.90	1.74	1.91	2.06	1.33	1.15	1.24	0.90	0.90	0.96	0.79
24	0.79	0.97	1.07	1.22	0.55	0.35	0.50	1.71	2.14	2.17	1.40	1.26	1.19	1.00	0.97	0.91	1.00
40	0.77	0.94	0.97	1.24	0.46	0.54	0.38	1.42	1.93	2.20	1.43	1.26	1.16	1.07	1.02	1.08	1.14
60	0.76	0.92	0.94	1.24	0.43	0.60	0.35	1.28	1.79	2.01	1.46	1.22	1.15	1.09	1.16	1.28	1.46
98	0.76	0.91	0.92	1.25	0.40	0.63	0.33	1.18	1.77	2.02	1.45	1.21	1.14	1.08	1.35	1.52	2.00

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
4	2.01	2.01	3.03	3.16	2.18	2.67	1.44	1.50	1.96	1.65	1.55	1.44	1.72	1.77	1.88	1.96	2.05
6	0.80	0.59	0.96	0.99	1.68	1.96	1.26	1.09	1.87	1.61	1.30	1.24	1.48	1.48	1.67	1.70	2.00
8	0.84	0.82	0.96	1.09	1.09	1.47	1.25	1.19	1.36	1.41	1.28	1.05	1.15	1.45	1.43	1.33	1.89
12	0.84	0.89	1.02	1.17	0.67	0.82	1.09	1.33	1.55	1.40	1.16	0.85	0.85	0.93	1.00	1.00	1.47
16	0.85	0.98	1.09	1.23	0.55	0.53	0.96	0.99	1.55	1.51	1.14	1.15	1.05	0.88	0.89	1.00	1.20
24	0.85	0.99	1.05	1.29	0.70	0.50	0.65	0.99	1.36	1.50	1.36	1.32	1.07	1.00	0.90	1.03	0.75
40	0.86	1.02	1.07	1.34	0.84	0.72	1.02	1.02	1.30	1.63	1.54	1.38	1.19	1.29	1.08	1.26	1.13
60	0.87	1.02	1.07	1.37	0.92	0.79	1.21	1.00	1.27	1.66	1.65	1.42	1.22	1.39	1.18	1.42	1.40
98	0.87	1.04	1.08	1.38	0.97	0.88	1.43	1.03	1.25	1.72	1.69	1.57	1.27	1.46	1.27	1.52	1.66

Initial Supporting table - Random_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomCylModDecel

Description: Used for P0300 - P0308. Multiplier to CylMode_Decel.   account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: Multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.15	1.00	1.00	1.00	1.00	1.00	1.60	1.50	1.45	1.52	1.00	1.05	1.10	1.03	1.00	1.00	1.00
10	1.32	1.00	1.32	1.27	1.19	1.00	1.30	1.58	1.42	1.92	1.33	1.70	1.46	1.63	1.06	1.06	1.00
14	1.22	1.00	1.17	1.19	1.26	1.09	1.58	1.51	1.65	2.16	1.67	1.54	1.63	1.36	1.12	1.05	1.06
24	1.20	1.00	1.15	1.13	1.17	1.04	1.22	1.50	1.98	2.23	1.87	1.52	1.47	1.24	1.32	1.09	1.29
30	1.19	1.00	1.09	1.11	1.15	1.02	1.12	1.38	1.90	2.25	1.92	1.40	1.35	1.21	1.33	1.11	1.32
60	1.17	1.00	1.05	1.08	1.12	1.00	1.01	1.15	1.72	2.07	1.90	1.16	1.16	1.16	1.37	1.14	1.52
98	1.18	1.00	1.03	1.06	1.10	1.00	1.00	1.07	1.70	1.99	1.90	1.08	1.08	1.10	1.36	1.15	1.59

Initial Supporting table - RandomCylModJerk

Description: Used for P0300 - P0308, Multiplier to CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.23	1.45	1.43	1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.11	1.06	1.04	1.07	1.33	1.00	1.20	1.00	1.10	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.08	1.14	1.11	1.00	1.14	1.00	1.38	1.17	1.16	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.05	1.06	1.08	1.00	1.10	1.00	1.29	1.06	1.19	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.02	1.00	1.01	1.00	1.02	1.03	1.49	1.03	1.03	1.17	1.00	1.00	1.18	1.00	1.00	1.00	1.00
30	1.02	1.00	1.01	1.00	1.02	1.03	1.52	1.06	1.01	1.17	1.00	1.00	1.18	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.68	1.18	1.00	1.17	1.00	1.00	1.24	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.72	1.26	1.00	1.18	1.00	1.00	1.26	1.00	1.00	1.00	1.00

Initial Supporting table - RandomRevModDecl

Description: Used for P0300 - P0308, Mulitplier to RevMode_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

Description: Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Value Units: multiplier
X Unit: RPM

y/x	600	1,000	1,200	1,400	1,600	1,800	2,000	2,600	3,200
1	1.00	1.19	1.04	1.04	1.00	1.00	1.34	1.10	1.30

Initial Supporting table - RevMode_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time between revolutions (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - Ring Filter

Description: Used for P0300-P0308. Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - SCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - SnapDecayAfterMisfire

Description: Used for P0300 - P0308, multiplier times the ddt_jerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Value Units: multiplier
X Unit: RPM
Y Units: gear ratio

y/x	600	1,000	1,200	1,400	1,600	1,800	2,000	2,600	3,200
1	1.30	1.30	1.40	1.20	1.10	1.30	1.15	1.00	1.00
1	1.30	1.35	1.75	1.00	1.25	1.15	1.20	1.00	1.00
1	2.20	2.20	2.40	1.20	1.00	1.50	1.20	1.00	1.60
1	2.00	2.00	3.19	2.00	1.25	1.15	1.10	1.00	1.40
1	2.00	2.00	2.80	2.30	1.55	1.25	1.30	1.00	1.00
2	2.20	2.20	2.20	2.30	2.10	1.20	1.20	1.00	1.40
2	1.90	2.10	2.80	2.40	2.00	1.50	1.30	1.25	1.60
3	1.10	1.40	1.45	1.40	1.40	1.50	1.50	1.35	1.60
5	1.10	1.30	1.20	1.55	1.30	1.30	1.40	1.20	1.40

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	-20	-15	-10	0	8	9	11	12
1	25	15	5	30	30	40	50	60

Initial Supporting table - T_MaxTempGrad

Description: Upper boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	200	225	250	275	300	350	400	450
1	200	200	200	200	200	200	200	200

Initial Supporting table - T_MinTempGrad

Description: Lower boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	200	225	250	285	300	315	400	450
1	40	40	40	40	40	30	30	30

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	5	5	5	5	10	10	10
150	5	5	5	5	10	10	10
200	5	5	5	5	10	10	10

Initial Supporting table - TOSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion value on Transmission Output Speed Sensor above which rough road is indicated present

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - WaitToStart

Description: Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Value Units: Number of Engine Cycles (integer)
X Unit: Engine Coolant (deg C)

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - WSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Value Units: acceleration
X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Initial Supporting table - ZeroTorqueAFM

Description: Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - ZeroTorqueEngLoad

Description: Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-1.78	-2.28	-2.62	-2.00	-1.49	-1.99	-2.09	-3.00	-2.02	-1.48	-1.51	-3.22	-2.07
75	-1.41	-1.91	-2.04	-1.79	-1.95	-1.55	-1.43	-1.56	-1.46	-0.87	-1.04	-1.42	-0.51
85	-1.08	-1.58	-1.81	-1.16	-1.45	-1.26	-1.48	-1.42	-0.85	-0.64	-1.62	-1.10	-0.16
95	0.45	-0.05	-0.39	-0.28	-0.12	-0.09	0.31	0.44	0.24	-0.81	-1.34	-2.10	-0.98
105	0.45	-0.05	-0.39	-0.28	-0.12	-0.09	0.31	0.44	0.24	-0.81	-1.34	-2.10	-0.98

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
65	-0.93	0.21	1.36	2.50	3.64	4.79	5.93	7.08	8.22	9.36	10.51	12.80	15.08
75	0.38	1.29	2.19	3.08	3.99	4.88	5.79	6.68	7.59	8.48	9.39	11.19	12.98
85	0.78	1.71	2.64	3.58	4.52	5.45	6.38	7.32	8.26	9.19	10.13	12.00	13.87
95	0.15	1.28	2.40	3.53	4.65	5.77	6.90	8.03	9.15	10.27	11.40	13.65	15.89
105	0.15	1.28	2.40	3.53	4.65	5.77	6.90	8.03	9.15	10.27	11.40	13.65	15.89

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	50	50	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	68	55	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	47	47	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	65	52	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	60	60	60	60	60	60	60	60

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	160	160	160	160	160	160	160	160

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	50	50	50	50	50	50	50	50

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	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	150	150	150	150	150	150	150	150

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in 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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in SCR temp 1 or DeSOx lean mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

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	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

y/x	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - 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_Grp1

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_Grp1	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_Grp1	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_Grp1

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_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1

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_Grp1

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_Grp1	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_Grp1

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	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

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

y/x	5	10	20	30	40	50	60	80	100	120
450	-12	-13	-12	-15	-18	-21	-23	-28	-30	-33
700	-12	-13	-14	-16	-18	-21	-23	-28	-30	-33
950	-12	-13	-16	-18	-19	-21	-23	-28	-30	-33
1,200	-12	-13	-17	-20	-22	-23	-24	-29	-30	-33
1,450	-12	-13	-17	-20	-23	-25	-26	-31	-32	-34
1,700	-12	-13	-17	-20	-23	-26	-30	-33	-34	-35
1,950	-12	-13	-17	-20	-23	-26	-30	-35	-36	-38
2,200	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41
2,800	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41
3,200	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41

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	85	100
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	85	100
1	1	1	1

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp1

Description: Map to define P026D threshold for combustion mode Group 1

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

y/x	15	20	25	30	35	40	41	70	80	90
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp2

Description: Map to define P026D threshold for combustion mode Group 2

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

y/x	15	20	25	30	35	40	41	70	80	90
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp3

Description: Map to define P026D threshold for combustion mode Group 3

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

y/x	15	20	25	30	35	40	41	70	80	90
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

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	20	25	30	35	40	45	46	70	80	90
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

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	20	25	30	35	40	45	46	70	80	90
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

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	20	25	30	35	40	45	46	70	80	90
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

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	1	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	1	1	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	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	220	220	220	220

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	176	164	150	150

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

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	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

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	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,200
1	1	1	1	1	1	1	0	0	0	0

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	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	150	160	170	180

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	84	94	104	114

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	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

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	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

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	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
1	2	2	2	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	1	1	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	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

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	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

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	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

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	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

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	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

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	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

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	580	600	620	640	720	780	880	950
6	-80	-80	-80	-80	-80	-200	-240	-280
8	-80	-80	-80	-80	-80	-200	-240	-280
10	-80	-80	-80	-80	-80	-200	-240	-280
12	-80	-80	-80	-80	-80	-200	-240	-280
18	-80	-80	-80	-80	-80	-200	-240	-280
24	-80	-80	-80	-80	-80	-200	-240	-280
30	-200	-200	-200	-200	-200	-200	-240	-280
36	-224	-224	-224	-224	-224	-224	-240	-280
40	-240	-240	-240	-240	-240	-240	-240	-280

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	580	600	620	640	720	780	880	950
6	-144	-144	-144	-144	-144	-184	-200	-248
8	-144	-144	-144	-144	-144	-184	-200	-248
10	-144	-144	-144	-144	-144	-184	-200	-248
12	-144	-144	-144	-144	-144	-184	-200	-248
18	-144	-144	-144	-144	-144	-184	-232	-272
24	-144	-144	-144	-144	-144	-192	-240	-280
30	-192	-192	-192	-192	-192	-200	-240	-280
36	-224	-224	-224	-224	-224	-224	-240	-280
40	-240	-240	-240	-240	-240	-240	-240	-280

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	580	600	620	640	720	780	880	950
6	-144	-144	-144	-144	-144	-184	-200	-248
8	-144	-144	-144	-144	-144	-184	-200	-248
10	-144	-144	-144	-144	-144	-184	-200	-248
12	-144	-144	-144	-144	-144	-184	-200	-248
18	-144	-144	-144	-144	-144	-184	-232	-272
24	-144	-144	-144	-144	-144	-192	-240	-280
30	-192	-192	-192	-192	-192	-200	-240	-280
36	-224	-224	-224	-224	-224	-224	-240	-280
40	-240	-240	-240	-240	-240	-240	-240	-280

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	579	580	999	1,000	1,500	1,501	1,600	1,601
50	-256	40	40	40	40	-256	-256	-256
55	-256	40	40	40	40	-256	-256	-256
60	-256	40	40	40	40	-256	-256	-256
65	-256	40	40	40	40	-256	-256	-256
70	-256	40	40	40	40	-256	-256	-256
75	-256	40	40	40	40	-256	-256	-256
80	-256	40	40	40	40	-256	-256	-256
85	-256	40	40	40	40	-256	-256	-256
90	-256	40	40	40	40	-256	-256	-256
100	-256	40	40	40	40	-256	-256	-256
110	-256	40	40	40	40	-256	-256	-256

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	579	580	999	1,000	1,500	1,501	1,600	1,601
50	256	5	5	5	5	256	256	256
55	256	5	5	5	5	256	256	256
60	256	5	5	5	5	256	256	256
65	256	5	5	5	5	256	256	256
70	256	5	5	5	5	256	256	256
75	256	5	5	5	5	256	256	256
80	256	5	5	5	5	256	256	256
85	256	5	5	5	5	256	256	256
90	256	5	5	5	5	256	256	256
100	256	5	5	5	5	256	256	256
110	256	5	5	5	5	256	256	256

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	579	580	999	1,000	1,500	1,501	1,600	1,601
50	52	52	52	52	52	52	52	52
55	52	52	52	52	52	52	52	52
60	52	52	52	52	52	52	52	52
65	52	52	52	52	52	52	52	52
70	52	52	52	52	52	52	52	52
75	52	52	52	52	52	52	52	52
80	52	52	52	52	52	52	52	52
85	52	52	52	52	52	52	52	52
90	52	52	52	52	52	52	52	52
100	52	52	52	52	52	52	52	52
110	52	52	52	52	52	52	52	52

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	1	1	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	70	83	96
1	2	1	2

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	70	83	96
1	2	2	2

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Running

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine running

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)
Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

Initial Supporting table - Cool Down Diagnostic Min Heat to Coolant

Description: KtECTR_P_CDD_HeatToCoolantMin

Value Units: Power (kW)
X Unit: Firing fraction (ratio)
Y Units: Ambient Air Temperature (Deg C)

y/x	0.00	0.25	0.50	0.67	1.00
-9.0	41.0	41.0	41.0	41.0	41.0
0.0	41.0	41.0	41.0	41.0	41.0
10.0	41.0	41.0	41.0	41.0	41.0
20.0	41.0	41.0	41.0	41.0	41.0
50.0	41.0	41.0	41.0	41.0	41.0

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	-20	-7	10	35	55	71	82
1	40,925	34,748	26,670	14,792	5,289	5,289	5,289

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	-20	-7	10	35	55	71	82
1	39,020	34,203	27,904	18,641	11,230	5,302	5,302

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	500.000	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	0.025	0.028	0.033	0.070	0.100	0.150	0.500	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.025	0.028	0.033	0.045	0.100	0.200	0.500	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
50	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	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
5	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
10	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
15	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
20	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
25	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
30	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
35	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
40	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
45	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
50	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
55	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
60	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
65	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
70	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
75	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
80	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
90	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535
100	535	535	535	535	535	535	535	535	535	535	535	535	535	535	535

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
5	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
10	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
15	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
20	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
25	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
30	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
35	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
40	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
45	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
50	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
55	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
60	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
65	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
70	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
75	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
80	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
90	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
100	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510

Initial Supporting table - DPF_ResistFlowDsblHi

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF_ResistFlowDsblLo

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	10	20	30	40	50	60	70	80
1	1	1	1	1	1	1	1	1

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqMaxThreshold

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_FuelReqMinThrsh

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
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	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,199.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,200.0	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	15.0	20.0	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	15.0	20.0	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 - EGT4 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT4 Dynamic Check.

y/x	0.0	15.0	20.0	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 - EGT5 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT5 Dynamic Check.

y/x	0.0	15.0	20.0	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 - EnginePointEnable_DPF_TempDeviation

Description:

y/x	950	1,000	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
60	0	1	1	1	1	1	1	1

Initial Supporting table - EnginePointEnable_HC_TempDeviation

Description:

y/x	950	1,000	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	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
50	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
300	0	0	0	0	0	0	0	0
450	0	0	0	0	0	0	0	0
600	0	0	0	0	0	0	0	0
750	0	0	0	0	0	0	0	0
900	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	198	199	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	1	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	1	1	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	1	0	0	

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	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

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	0	0	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	214	122	90	90	90

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	-214	-122	-90	-80	-80

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	173	173	173	173	173

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	800	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250
1	30	40	40	60	60	100	110	110	80	80	80	70

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-12	-13	-12	-15	-18	-21	-23	-28	-30	-33
700	-12	-13	-14	-16	-18	-21	-23	-28	-30	-33
950	-12	-13	-16	-18	-19	-21	-23	-28	-30	-33
1,200	-12	-13	-17	-20	-22	-23	-24	-29	-30	-33
1,450	-12	-13	-17	-20	-23	-25	-26	-31	-32	-34
1,700	-12	-13	-17	-20	-23	-26	-30	-33	-34	-35
1,950	-12	-13	-17	-20	-23	-26	-30	-35	-36	-38
2,200	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41
2,800	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41
3,200	-12	-13	-17	-20	-23	-26	-30	-35	-38	-41

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	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	190	190	190	190	190

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	-120	-80	-70	-69	-40	0	40	41	42	60	75
-120	0	0	0	0	0	0	0	0	0	0	0
-78	0	0	0	0	0	0	0	0	0	0	0
-77	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - 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	150	150	150	150	150	150	150	150

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	5	5	5	5	5	5	5	5

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	419	590	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	0	13	13	13	13	13	13	13	13	13	13	13	13	13

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	1,250	3,500	4,500
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_MainCatTempSnsr

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	200.000	200.000	500.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

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

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_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	8.700	9.000	9.200	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
400	1,092	1,071	1,049	4,096	4,096	4,096
550	1,065	1,049	1,033	477	197	207
600	1,055	1,040	1,024	469	193	202
650	1,060	1,043	1,025	469	192	197
700	1,065	1,045	1,025	469	191	192
750	1,059	1,039	1,019	464	191	186
800	1,053	1,033	1,012	458	191	179
850	1,036	1,020	1,005	193	193	193
900	1,018	1,007	997	215	215	215
1,000	995	986	978	238	238	238
1,100	937	930	923	260	260	260
1,800	588	913	597	280	280	280
2,000	726	722	511	300	300	300
2,200	340	340	340	340	340	340
2,400	365	365	365	365	365	365
2,600	390	390	390	390	390	390
4,800	-30	-30	-30	-30	-30	-30

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	120	180	200
1,000	98	94	90	83	80
1,250	98	95	91	85	83
1,500	98	95	92	86	84
1,750	98	95	92	87	86
2,000	98	95	92	88	87
2,250	98	95	93	88	87
2,500	95	92	90	86	85
4,000	60	59	58	55	55

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	20	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 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	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

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	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17

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	1,250	3,500	4,500
1	67	217	217	117

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	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

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 - 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	0.00	0.00	0.00	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	32,767.00	32,767.00	32,767.00	32,767.00

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	1	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	550	600	800	1,050	1,560
-20	36	36	36	36	36
-10	25	25	25	25	25
0	20	20	20	20	20
20	16	16	16	16	16
50	10	10	10	10	10
70	9	9	9	9	9

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	550	600	800	1,050	1,560
-20	39	39	39	39	39
-10	23	23	23	23	23
0	17	17	17	17	17
20	13	13	13	13	13
50	7	7	7	7	7
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	550	600	800	1,050	1,560
-20	15	15	15	15	15
-10	15	15	15	15	15
0	15	15	15	15	15
20	15	15	15	15	15
50	15	15	15	15	15
70	12	12	12	12	12

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	550	600	800	1,050	1,560
-20	11	11	11	11	11
-10	11	11	11	11	11
0	11	11	11	11	11
20	11	11	11	11	11
50	11	11	11	11	11
70	5	5	5	5	5

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	550	600	800	1,050	1,560
-20	39	39	39	39	39
-10	29	29	29	29	29
0	20	20	20	20	20
20	13	13	13	13	13
50	12	12	12	12	12
70	11	11	11	11	11

Initial Supporting table - P054E_IFM_MinFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	13	13	13	13	13
-10	11	11	11	11	11
0	7	7	7	7	7
20	8	8	8	8	8
50	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	550	600	800	1,050	1,560
-20	36	36	36	36	36
-10	24	24	24	24	24
0	17	17	17	17	17
20	13	13	13	13	13
50	9	9	9	9	9
70	8	8	8	8	8

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	550	600	800	1,050	1,560
-20	13	13	13	13	13
-10	11	11	11	11	11
0	10	10	10	10	10
20	8	8	8	8	8
50	5	5	5	5	5
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	1	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	550	600	800	1,050	1,560
-20	52	52	52	52	52
-10	45	45	45	45	45
0	40	40	40	40	40
20	33	33	33	33	33
50	26	26	26	26	26
70	25	25	25	25	25

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	550	600	800	1,050	1,560
-20	54	54	54	54	54
-10	41	41	41	41	41
0	36	36	36	36	36
20	30	30	30	30	30
50	25	25	25	25	25
70	23	23	23	23	23

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	550	600	800	1,050	1,560
-20	26	26	26	26	26
-10	26	26	26	26	26
0	26	26	26	26	26
20	26	26	26	26	26
50	26	26	26	26	26
70	25	25	25	25	25

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	550	600	800	1,050	1,560
-20	22	22	22	22	22
-10	22	22	22	22	22
0	22	22	22	22	22
20	22	22	22	22	22
50	22	22	22	22	22
70	19	19	19	19	19

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	550	600	800	1,050	1,560
-20	46	46	46	46	46
-10	35	35	35	35	35
0	30	30	30	30	30
20	25	25	25	25	25
50	23	23	23	23	23
70	22	22	22	22	22

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	550	600	800	1,050	1,560
-20	24	24	24	24	24
-10	23	23	23	23	23
0	18	18	18	18	18
20	19	19	19	19	19
50	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	550	600	800	1,050	1,560
-20	52	52	52	52	52
-10	42	42	42	42	42
0	36	36	36	36	36
20	31	31	31	31	31
50	29	29	29	29	29
70	25	25	25	25	25

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	550	600	800	1,050	1,560
-20	32	32	32	32	32
-10	31	31	31	31	31
0	26	26	26	26	26
20	27	27	27	27	27
50	21	21	21	21	21
70	20	20	20	20	20

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	500.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

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

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_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 - 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	1	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	1	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	1	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	1,800	1,800	1,600	1,500
1	1,800	1,800	1,600	1,500
2	1,800	1,800	1,600	1,500
3	1,800	1,800	1,600	1,500
4	1,800	1,800	1,600	1,500

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	1,800	1,800	1,800	1,800
1	1,800	1,800	1,800	1,800
2	1,800	1,800	1,800	1,800
3	1,800	1,800	1,800	1,800
4	1,800	1,800	1,800	1,800

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,800	1,800	1,600	
1	1,800	1,800	1,600	
2	1,800	1,800	1,600	
3	1,800	1,800	1,600	
4	1,800	1,800	1,600	

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	1,000	1,250	1,200	1,150
1	1,000	1,250	1,200	1,150
2	1,000	1,250	1,200	1,150
3	1,000	1,250	1,200	1,150
4	1,000	1,250	1,200	1,150

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	1,250	1,000	1,000	1,000
1	1,250	1,000	1,000	1,000
2	1,250	1,000	1,000	1,000
3	1,250	1,000	1,000	1,000
4	1,250	1,000	1,000	1,000

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,000	1,000	1,200	
1	1,000	1,000	1,200	
2	1,000	1,000	1,200	
3	1,000	1,000	1,200	
4	1,000	1,000	1,200	

Initial Supporting table - RufCyl_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Decel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,416	927	621	380	255	190	158	148	77	64	41	34	31
2	1,014	689	483	304	207	166	123	118	65	49	32	28	25
4	562	411	312	212	150	133	98	78	50	33	20	22	18
6	1,157	734	469	288	185	132	98	78	60	35	26	22	18
8	1,445	919	580	375	230	167	106	83	69	44	30	25	20
10	2,224	1,341	824	465	296	199	111	91	77	49	36	29	22
12	2,950	1,793	1,093	630	428	263	132	96	85	61	47	33	25
14	3,638	2,236	1,357	796	561	327	173	129	113	76	57	42	30
16	4,118	2,672	1,619	962	693	391	214	159	138	90	68	51	36
18	4,628	3,114	1,887	1,127	825	455	256	189	163	105	79	59	41
20	5,127	3,486	2,146	1,294	958	520	297	218	188	120	89	68	47
22	5,630	3,844	2,416	1,458	1,090	584	338	248	213	134	100	77	52
24	6,153	4,206	2,678	1,624	1,222	647	379	278	238	149	111	86	58
30	7,666	5,265	3,471	2,123	1,619	839	503	367	313	193	143	112	74
40	10,220	7,063	4,795	2,949	2,280	1,160	709	515	439	266	197	155	102
60	15,311	10,618	7,314	4,604	3,526	1,802	1,122	813	690	412	304	242	157
97	20,000	17,308	11,972	7,711	5,801	3,005	1,895	1,369	1,160	686	505	406	260

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	28	25	18	20	16	15	32,766	32,768	32,768	32,768	32,768	32,768	32,768
2	25	23	17	19	15	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
4	22	18	14	16	14	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
6	19	11	12	14	13	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
8	19	11	11	9	12	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
10	19	14	11	9	10	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
12	20	17	13	11	10	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
14	22	20	16	13	11	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
16	26	23	18	15	12	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
18	30	26	21	17	13	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
20	34	29	23	18	14	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl_Decel

22	38	32	26	20	15	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
24	42	35	28	22	16	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
30	53	43	35	27	19	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
40	73	58	48	36	24	18	32,766	32,768	32,768	32,768	32,768	32,768	32,768
60	112	88	72	54	35	24	32,766	32,768	32,768	32,768	32,768	32,768	32,768
97	186	143	118	87	54	37	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl_Jerk

Description: Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Jerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,154	761	500	325	222	155	120	141	77	59	43	34	32
2	931	618	409	271	181	131	100	112	64	51	35	28	26
4	755	490	323	196	135	95	94	83	54	40	27	23	20
6	808	565	431	239	187	155	94	84	54	40	25	23	20
8	1,481	949	607	385	251	175	94	85	61	41	25	24	20
10	2,258	1,437	880	586	377	243	100	85	61	41	29	28	21
12	2,572	1,735	1,153	787	502	311	114	91	78	48	36	32	25
14	2,972	2,028	1,370	988	627	379	140	115	95	62	47	36	29
16	3,355	2,313	1,591	1,081	753	447	153	139	112	77	58	40	32
18	3,741	2,600	1,807	1,231	877	514	167	163	129	92	69	44	36
20	4,144	2,888	2,016	1,380	1,001	582	181	175	145	106	78	48	40
22	4,535	3,175	2,238	1,529	1,114	651	192	182	162	121	88	52	44
24	4,920	3,457	2,451	1,679	1,226	717	205	188	177	136	98	56	48
30	6,120	4,333	3,099	2,125	1,565	921	245	210	208	180	128	68	59
40	8,096	5,770	4,181	2,871	2,132	1,260	309	246	260	253	177	87	78
60	12,070	8,663	6,347	4,365	3,266	1,938	439	317	363	399	276	127	116
97	19,526	14,083	10,393	7,156	5,384	3,210	681	451	557	674	461	200	186

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	29	22	23	20	22	18	32,766	32,768	32,768	32,768	32,768	32,768	32,768
2	26	19	21	18	20	17	32,766	32,768	32,768	32,768	32,768	32,768	32,768
4	22	15	18	16	18	16	32,766	32,768	32,768	32,768	32,768	32,768	32,768
6	18	11	15	13	15	15	32,766	32,768	32,768	32,768	32,768	32,768	32,768
8	18	11	10	11	12	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
10	17	12	10	8	10	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
12	17	15	10	10	10	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
14	20	19	14	13	11	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
16	25	23	17	16	13	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
18	29	26	20	18	15	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
20	33	30	24	21	17	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl_Jerk

22	38	34	27	23	19	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
24	42	37	30	26	21	16	32,766	32,768	32,768	32,768	32,768	32,768	32,768
30	55	48	40	34	26	20	32,766	32,768	32,768	32,768	32,768	32,768	32,768
40	76	67	57	47	36	28	32,766	32,768	32,768	32,768	32,768	32,768	32,768
60	119	103	91	73	55	38	32,766	32,768	32,768	32,768	32,768	32,768	32,768
97	200	172	153	122	90	60	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufSCD_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usec)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Decel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD_Decel

18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Jerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD_Jerk

20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	This DTC monitors for an error in the Steering Wheel Angle Sensor Signal Message Counter	Communication of the Alive Rolling from the Steering Wheel Angle Sensor over CAN bus is incorrect for out of total samples Or Communication of theProtection Value from the Steering Wheel Angle Sensor over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts >= 2.00 counts >= 18.00 counts	Message frame	= Is available	Executes in 10ms loop.	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 Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	≤ -3.8500 g ≥ -3.8500 g (≤ 0.5 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. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	≥ 3.8500 g ≤ 3.8500 g (≤ 0.5 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. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	≥ 0.5300 g ≤ 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean ≥ 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	≤ -3.8500 g ≥ -3.8500 g (≤ 0.5 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. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	≥ 3.8500 g ≤ 3.8500 g (≤ 0.5 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. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	≥ 0.0800 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 1 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 50.0 Nm ≥ 0.0800 g ≥ 2.0 KPH ≤ 120.0 KPH	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate region 1 fail time ≥ 4.0 seconds out of region 1 sample time ≥ 5.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	 ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 0.0 KPH ≤ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 2 fail time ≥ 75.0 seconds out of region 2 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≤ 0.1000 g ≥ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 3 fail time ≥ 75.0 seconds out of region 3 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	≥ 0.1700 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 1 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 4 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≤ 50.0 Nm ≤ -0.1700 g ≥ 2.0 KPH ≤ 120.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time ≥ 2.0 seconds out of region 4 sample time ≥ 2.5 seconds, 50 millisecond update rate	

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

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.	Time new seed not received exceeded			always running	409.594 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's ALU check		Test is Enabled CPU1 Test is Enabled CPU2 Test is Enabled CPU3 Test is Enabled CPU4	= 0 Boolean = 1 Boolean = 0 Boolean = 0 Boolean	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.450 seconds continuous; 50 ms/count in the 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	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			occured since last controller initialization. Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.	test enable	= **P0606_Program Sequence Watch Enable f(Core, Loop Time)**	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 A, 1 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Actuator Supply Voltage Circuit Low	P0658	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	≤ 0.5 Ω impedance between signal and controller ground OR ≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count ≥ 6 counts within sample count of 2,400 counts OR open circuit fail count ≥ 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	≤ 7.281 % duty cycle ≥ 7.281 % 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 ≥ 0.00 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.	≥ 92.221 % duty cycle ≤ 92.221 % 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 ≥ 0.00 volts = CeTRGD_e_VoltDirctProp	fail time ≥ 0.900 seconds out of sample time ≥ 1.100 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	= 1 Boolean		
					P0712 NOT fault active			
					P0713 NOT fault active			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					warm up test enable	= 1 Boolean		
					TFT rationality diagnostic monitor enabled	= VeTFSR_b_TFT_RatlEnbl		
					driver accelerator pdeal position	≥ 5.0 %		
					engine torque	≥ 50.0 Nm		
					engine speed	≥ 500.0 RPM		
					vehicle speed	≥ 10.0 KPH		
					engine coolant temperature	≥ -40.0 °C		
					engine coolant temperature	≤ 150.0 °C		
					raw transmission fluid temperature	≥ -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 ≥ 600.0 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	= 1 Boolean		
					P0712 NOT fault active			
					P0713 NOT fault active			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					stuck in range test enable	= 1 Boolean		
					propulsion system active	= TRUE		
					raw transmission fluid temperature	≥ -40.0 °C		
					raw transmission fluid temperature	≤ 150.0 °C		

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	≤ 13.000 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts	fail time ≥ 5.00 seconds out of sample time ≥ 6.00 seconds 1 seconds update rate battery voltage in range time ≥ 0.100 seconds run crank voltage in range time ≥ 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	≥ 206,875.0 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			fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate	Type A, 1 Trips
					service mode $04 active	= FALSE		
					diagnostic monitor enable	= 1 Boolean (0 is disable, 1 is enable)		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					High Side Driver 1 and 2	= TRUE		
					Run Crank Voltage	≥ 9.0 Volts		
					Service Fast Learn	= FALSE		
					Run Crank Active	= TRUE		
					last valid raw transmission input speed	≥ 240.0 RPM	raw transmission input speed time ≥ 2.000 seconds	
					OR			
					valid raw transmission input speed (before drop event)	≥ 240.0 RPM		
					******************************	******************************		
					Stability Criteria last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as			
					(delta delta raw transmission input speed	≤ 320.0 RPM	stability time ≥ 0.100 seconds	
					AND			
					raw transmission input	> 200.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					speed)			
					raw transmission output speed	≥ 377.0 RPM		
					accelerator pedal position	≥ 5.0 %		
					engine torque	≤ 8,191.9 Nm		
					engine torque	≥ 30.0 Nm		
					hydraulic system pressure available	= TRUE		
					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.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	≤ 168.0 RPM < 175.0 RPM	service mode $04 active diagnostic monitor enable run crank active service fast learn active run crank voltage hydraulic pressure avail P0722 fault active P0723 fault active P077C fault active P077D fault active 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 AND ***************************** (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)	= FALSE = 1 Boolean (0 is disable, 1 is enable) = TRUE = FALSE ≥ 9.0 volts = TRUE = FALSE = FALSE = FALSE = FALSE < 70.0 % = FALSE = FALSE = FALSE ≥ 5.0 % ≥ 30.0 Nm ≤ 8,191.9 Nm ***************************** ≤ CeCGSR_e_CR_Fourth ≥ CeCGSR_e_CR_First ≥ 250.0 RPM ≤ CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Fourth ≥ 377.0 RPM	fail time ≥ 4.00 seconds run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					******************************	******************************		
					AND			
					(P0717 fault active	= FALSE		
					OR			
					P0717 test fail this key on)	= FALSE		
					******************************	******************************		
					TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when:			
					(P0722 fail time high gear exceeds fail threshold	≥ 4.00 s		
					OR			
					P0722 fail time low gear exceeds fail threshold)	≥ 3.00 s		
					AND			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					TISS/TOSS single power supply test enabled	= 1 Boolean		
					Raw Input Speed	< 175.00 rpm		
					DTCs not fault active	EngineTorqueEstInaccurate		

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 6.25 ms update rate	≠ FORWARD ≠ REVERSE ≥ 225.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period (P0721 fault active OR P0721 test fail this key on) senor type is directional senor type cailbration ****************************** TOSS transitional period detected = FALSE when: (on period OR on period when direction unknown OR on period AND on period when direction is reverse OR on period AND on period when direction is forward) TOSS transitional period detected = TRUE when: on period AND	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTOSR_e_Directional ****************************** ≥ 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 ≥ 7.000 seconds out of sample time ≥ 10.000 seconds	Type A, 1 Trips

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

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 use high gear fail time threshold when: (attained gear attained gear attained gear) 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 or shift occurs: (Intrusive Shift Active OR (garage shift AND Locked to Freewheel AND Freewheel to Locked) 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 accelerator pedal (TCC slip	= FALSE = 1 Boolean ****************************** = TRUE ≠ COMPLETE = FALSE = FALSE = PARK = NEUTRAL ≠ no inhibit active ≥ 8,192.0 Nm ≥ 100.0 % ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth ≥ 30.0 Nm ≥ 3.0 % > 100.00 rpm	fail time ≥ 4.00 seconds high gear OR fail time ≥ 3.00 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.
					OR TCC mode)) when not neutral range occurs: (attained gear engine torque accelerator pedal (TCC slip OR TCC mode)) ******************************	 ≠ Off Mode ≤ CeCGSR_e_CR_Fourth ≥ 50.0 Nm ≥ 3.5 % > 100.00 rpm ≠ Off Mode ******************************		
					(TISS AND TISS) OR (Engine Speed AND Engine Speed) ******************************	≤ 8,191.9 RPM ≥ 175.0 RPM ≤ 8,191.9 RPM ≥ 3,500.0 RPM ******************************		
					P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on	= FALSE = FALSE = FALSE = FALSE		
					PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active)	 = 1 Boolean = 1 Boolean = FALSE		
					run crank voltage	≥ 5.00 volts	run crank voltage time ≥ 25 milliseconds	
					service fast learn active run crank voltage	= FALSE ≥ 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission fluid temperature P0723 test fail this key on P077C test fail this key on P077D test fail this key on (P0722 fault active OR P0722 test fail this key on) (Hydraulic Pressure Avail Trans Engaged State) DTCs not fault active	≥ -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE ≠ NotEngaged AcceleratorPedalFailure EngineTorqueEstInaccurate	Pressure and Trans Engaged for delay time **P0722 OSS Direction Change Delay**	

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	≥ 1,755.0 RPM ≥ 650.0 RPM			fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate	Type A, 1 Trips
					service mode $04 active	= FALSE		
					diagnostic monitor enable	= 1 Boolean		
					transmission engaged state	≠ not engaged	transmission engaged state time ≥ **P0723 transmission engaged state time threshold**	
					4WD low state	= 4WD low state previous loop, 25 millisecond update rate	4WD low change time ≥ 3.0 seconds	
					PTO check: PTO disable calibration is FALSE OR	≠ 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(PTO disable calibration is TRUE AND PTO active)	= 1 Boolean = FALSE		
					run crank voltage	≥ 5.00 volts	run crank voltage time ≥ 25 milliseconds	
					service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on	= FALSE ≥ 9.00 volts = FALSE = FALSE		
					******************************	******************************		
					when PRNDL is moved to NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation:			
					PRNDL OR	= CeTRGR_e_PRNDL_Neutral		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional1 N-D transitional		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional4 R-N transitional		
					raw transmission output speed OR	≥ 250.0 RPM		
					last valid raw transmission output speed	≥ 250.0 RPM		
					******************************	******************************		
					determine if raw transmission input speed is stable:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(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) ****************************** select delta RPM fail theshold: (4WD low state AND 4WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold ****************************** last valid raw transmission output speed OR valid raw transmission output speed (before drop event) last valid raw transmission output speed updates every 25 milliseconds when stablity time complete as long as (delta delta raw transmission output speed AND raw transmission output speed) hydraulic pressure avail	≤ 4,095.9 RPM ≥ 200.0 RPM = 0 Boolean = 0.0 RPM ****************************** = TRUE = TRUE ****************************** > 36.0 RPM > 36.0 RPM ≤ 140.0 RPM ≥ 36.0 RPM = TRUE	raw transmission input speed stability time ≥ 2.00 seconds no time required raw transmission output speed time ≥ 2.00 seconds stability time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					******************************	******************************		
					PRNDL	≠ ParkCeTRGR_e_PRNDL_Park		
					AND PRNDL	≠ CeTRGR_e_PRNDL_Transitional2		
					AND			
					******************************	******************************		
					((PRNDL	= CeTRGR_e_PRNDL_Neutral		
					OR PRNDL	= CeTRGR_e_PRNDL_Transitional1		
					OR PRNDL)	= CeTRGR_e_PRNDL_Transitional4		
					AND			
					(Output Speed	≥ 50.00 RPM		
					raw transmission output speed - raw transmission output speed previous, 25 millisecond update))	< 20.00 AND > -140.00	Delta met time > 2.00	
					OR			
					******************************	******************************		
					(PRNDL	≠ CeTRGR_e_PRNDL_Neutral		
					AND PRNDL	≠ CeTRGR_e_PRNDL_Transitional1		
					AND PRNDL)	≠ CeTRGR_e_PRNDL_Transitional4		
					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.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 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.	calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate	> **P0741 GR10 torque converter K factor fail limit** see supporting table			fail count ≥ 4 counts in 75 count sample 25 millisecond update rate	Type A, 1 Trips
					diagnostic monitor enable	= 1 Boolean		
					(TCC stuck off enable	= 1 Boolean		
					OR			
					TCC stuck on enable)	= 1 Boolean		
					hydraulic pressure available:			
					engine speed	≥ 500.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					PRNDL	≠ PARK		
					PRNDL	≠ NEUTRAL		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine speed	≥ 1,500.0 RPM		
					intrusive shift active (intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821)	= FALSE		
					P0741 test fail this key on	= FALSE		
					range shift state	= range shift complete (steagy state gear)		
					attained gear slip	≤ 75.0 RPM		
					engine torque	≥ 5.00 Nm		
					accelerator pedal position	≥ 0.00 %		
					accelerator pedal position	≤ 100.0 %		
					transmission torque converter speed ratio (transmission turbine shaft speed / engine speed)	≤ 0.900		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate CrankSensor_FA 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 (GR10)	P0746	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 2 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE OR	= 1 Boolean		
					(use battery voltage calibration is TRUE AND	= 1 Boolean		
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE OR	= 0 Boolean		
					(use run crank voltage calibration is TRUE AND	= 0 Boolean		
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C1 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C1 clutch slip speed valid	= FALSE Boolean = TRUE ≥ 10.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 0.500 seconds	

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 clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GR10 CB123456R) clutch pressure control solenoid.				speed calculation)		
					C1 clutch pressured map	= mapped to line pressure, C1 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 garage shift: C1 clutch slip speed ELSE shift is another type: C1 clutch slip speed update fail time 6.25 milliscond update	 < 50.0 RPM < 100.00 RPM < 50.0 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.150 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millisecond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C1 CB123456R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available hydraulic pressure ***************************** range shift state diagnostic clutch test transmission output shaft speed ((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C1 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ≥ 10 kPa ****************************** ≠ range shift complete = OFF GOING CLUTCH TEST ≥ 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) ≤ 350.0 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C1 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C1 exhaust delay open throttle power on up shift** garage shifts: **C1 exhaust delay garage shift** closed throttle downshift: **C1 exhaust delay closed throttle down shift** negative torque upshift: **C1 exhaust delay negative torque up shift** open throttle downshift: **C1 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,191.8 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal)	enable)		
					OR			
					(primary oncoming clutch active	= TRUE		
					primary on coming control state	≠ clutch fill phase		
					primary on coming commanded pressure)	≥ pressure clip threshold according to shift type:		
						closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	
						clip thresholds for all other shift types:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts**		
						closed throttle downshift: **Clutch Clip Press CD Shifts**		
						negative torque upshift: **Clutch Clip Press NU Shifts**		
						open throttle downshift: **Clutch Clip Press PD Shifts**		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					*****************************	*****************************		
					conditions needed to trigger test:			
					(current shift type	≠ Garage shift		
					AND shift type enable cal for current shift type)	= **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active	= FALSE		
					AND shift type enable cal for garage shift	= 1 (0 will enable, 1 will enable)		
					AND Attained Gear	= NEUTRAL OR commanded gear		
					AND (stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777, P0797, P2715, P2724, P2733, P2821.			

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 (GR10)	P0776	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C2 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 2 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 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			

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			procedure active hydraulic pressure available hydraulic line pressure ***************************** enable C2 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C2 clutch slip speed valid	= FALSE Boolean = TRUE ≥ 10.00 kPa ***************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	 ≥ 0.500 seconds	

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 clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GR10 CB128910R) clutch pressure control solenoid.			 C2 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ****************************** DTCs not fault pending DTCs not fault active	speed calculation) = mapped to line pressure, C2 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 garage shift: C2 clutch slip speed ELSE shift is another type: C2 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C2 CB128910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ 10 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C2 off going clutch pressure control ramp time out complete	= TRUE		
					AND			
					off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C2 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C2 exhaust delay open throttle power on up shift** open throttle upshift: **C2 exhaust delay open throttle power on up shift** garage shifts: **C2 exhaust delay garage shift** closed throttle downshift: **C2 exhaust delay closed throttle down shift** negative torque upshift: **C2 exhaust delay negative torque up shift** open throttle downshift: **C2 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck on torque enable cal)	≥ 8,192 Nm = 0 (0 is enable, 1 is enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	 = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Clutch Clip Press GS Shifts closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation	= TRUE		
					****************************** conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND	****************************** ≠ Garage shift **Clutch Stuck On Shift** = **Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P2724, P2733, P2821.			

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, fail count ≥ 16 counts 6.25 millisecond update rate service fast learn, run crank and battery voltage time ≥ 5.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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, fail count ≥ 16 counts 6.25 millisecond update rate service fast learn, 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 (GR10)	P0796	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C3 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 2 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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			

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			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C3 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C3 clutch slip speed valid	= FALSE Boolean = TRUE ≥ 10.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 0.500 seconds	

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 clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GR10 C23457910) clutch pressure control solenoid.				speed calculation)		
					C3 clutch pressured map	= mapped to line pressure, C3 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 garage shift: C3 clutch slip speed ELSE shift is another type: C3 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.35 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millisecond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C3 C23457910 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ 10 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C3 off going clutch pressure control ramp time out complete	= TRUE		
					AND off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C3 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C3 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C3 exhaust delay open throttle power on up shift** garage shifts: **C3 exhaust delay garage shift** closed throttle downshift: **C3 exhaust delay closed throttle down shift** negative torque upshift: **C3 exhaust delay negative torque up shift** open throttle downshift: **C3 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C3 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					*****************************	*****************************		
					conditions needed to trigger test:			
					(current shift type	≠ Garage shift		
					AND shift type enable cal for current shift type)	**Clutch Stuck On Shift** = **Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active	= FALSE		
					AND shift type enable cal for garage shift	= 1 (0 will enable, 1 will enable)		
					AND Attained Gear	= NEUTRAL OR commanded gear		
					AND (stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***************************** DTCs not fault pending DTCs not fault active	enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777, P0797, P2715, P2724, P2733, P2821.			

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, fail count ≥ 16 counts 6.25 millisecond update rate service fast learn, 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	= FALSE = 1 Boolean = FALSE	fail time ≥ 0.050 seconds, update fail count, fail count ≥ 16 counts 6.25 millisecond update rate	Type A, 1 Trips
					service fast learn run crank voltage battery voltage	= FALSE ≥ 10.00 volts ≥ 10.00 volts	run crank and battery voltage time ≥ 5.000 seconds	
					P07C0 fault active P07C0 test fail this key on	= FALSE = FALSE		

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. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostics – Type C
			switch state update fail time 2 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostics – Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active	= FALSE		
					P0826 test fail this key on	= FALSE		
					P0826 fault pending	= FALSE		
					(P0816 fault active OR	= FALSE		
					P0816 fault active test fail this key on)	= FALSE		
					PRNDL range change time	≥ 1.00 seconds		
					PRNDL in range:			
					D1 OR	= 1 Boolean		
					D2 OR	= 1 Boolean		
					D3 OR	= 1 Boolean		
					D4 OR	= 1 Boolean		
					D5 OR	= 1 Boolean		
					D6 OR	= 1 Boolean		
					D7 OR	= 1 Boolean		
					D8 OR	= 1 Boolean		
					D9 OR	= 1 Boolean		
					D10 OR	= 1 Boolean		
					NEUTRAL OR	= 0 Boolean		
					PARK OR	= 0 Boolean		
					REVERSE	= 0 Boolean		
					DTCs not fault pending	Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time ≥ 60.00 seconds run crank voltage time ≥ 25 milliseconds	Emissions Neutral Diagnostics – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, or 8 speed CB1278R clutch or CVT secondary pulley, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	≥ 200 K Ω impedance between signal and controller ground			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, or 8 speed CB1278R clutch or CVT secondary pulley, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed, 10 speed CB123456R, 8 speed CB1278R clutch or CVT secondary pulley, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch or CVT primary pulley, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch or CVT primary pulley, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch or CVT primary pulley, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, or 8 speed C13567, clutch or CVT line pressure, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38,10 speed C23457910, or 8 speed C13567 clutch,or CVT line pressure, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, or 8 speed C13567,clutch or CVT line pressure, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	P16F3	The diagnostic monitor is a rationalization of transmission control command values vs. the established command limits. The transmission control system calculates limits for clutch pressures and gears and compares final commands to thest limits such that the final commands should never exceed the limits. The limits are also provided to the monitor ring which verifies that the final commanded state does not violate the provided limits. If the command violates the limits, the monitor will accrue fail time and flag this condition as a processor error. The command pressure (tie up) fault detection is designed to verify the commanded clutch pressures do not exceed the allowed clutch pressures, a condition which could lead to a vehicle deceleration above the design safety metric. The highest allowed pressure is calculated in the controls limit function and is	command pressure (tie up) fault detection commanded clutch pressure see also **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	> controls limit function highest allowed clutch pressure	Commanded Shift Monitor limit checking enabled (Reduandant Memory Command Gear Not Disabled OR Reduandant Memory Command Gear Enabled) (signed vehicle speed OR tie up monitor fault pending OR (signed vehicle speed AND enabled previous loop)) service fast learn active OR (service fast learn active AND vehicle speed AND vehicle speed max time) high side driver 1 AND high side driver 2 are on following speed sensor DTCs FA: P077C, P077D	= 1 (1 = enabled) = 0 (1 = disabled) = 1 (1 = enabled) >= 5.0 KPH = TRUE >= 5.0 KPH = FALSE = TRUE >= 8.0 KPH > 2.5 s = TRUE = FALSE	fail percentage increments 3.1 % per 6.25 ms fail reported for percentage >= 100 %	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		provided to both the monitor/diagnostic function and the pressure command function. Any commanded exceedance of the maximum allowed pressure is flagged as a control system failure and will accrue diagnostic fail time. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift to a gear lower than the lowest allowed gear. The lowest allowed gear is calculated in the controls limit function and is provided to both the monitor/diagnostic function and the gear scheduling function. Any commanded exceedance of the lowest allowed gear is flagged as a control system failure and will accrue diagnostic fail time. The clutch connectivity detection is designed to verify the commanded clutch state will produce the driver intended range such as neutral, drive or			following speed sensor DTCs TFTKO: P0722, P0723	= FALSE		
			command gear/shift fault detection signed vehicle speed commanded gear	>= 0 KPH < controls limit function lowest allowed gear	Commanded Shift Monitor limit checking enabled (Reduandant Memory Command Gear Not Disabled OR Reduandant Memory Command Gear Enabled) service fast learn active OR (service fast learn active AND vehicle speed AND vehicle speed max time) high side driver 1 AND high side driver 2 are on following speed sensor DTCs FA: P0721, P077C, P077D following speed sensor DTCs TFTKO: P0722, P0723, P172A, P172B	= 1 (1 = enabled) = 0 (1 = disabled) = 1 (1 = enabled) = FALSE = TRUE >= 8.0 KPH > 2.5 s = TRUE = FALSE = FALSE	fail percentage increments 1.4 % per 6.25 ms fail reported for percentage >= 100 %	
			clutch connectivity fault detection active clutches are		Clutch connectivity limit checking enabled (	= 1 (1 = enabled)	Illegal Drive time >= **Illegal Drive Fail Threshold**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		reverse. The incorrect ratio detection uses measured ratio and direction information to verify the transmission powerflow state matches the driver intended direction	determined by clutch pressure above return sping thresholds: (Clutch1 Clutch2 Clutch3 Clutch4 Clutch5 Clutch6 AND filtered clutch pressure above return spring rate of drop) illegal active clutch combination for the current selected range (Drive OR Park / Neutral OR Reverse	**Clutch1 Active** > **Pressure Threshold** **Clutch2 Active** > **Pressure Threshold** **Clutch3 Active** > **Pressure Threshold** **Clutch4 Active** > **Pressure Threshold** **Clutch5 Active** > **Pressure Threshold** **Clutch6 Active** > **Pressure Threshold** <= -1 = **Illegal Drive Clutch Combinations** = **Illegal Park/Neutral Clutch Combinations** =	Reduandant Memory Clutch Connectivity Not Disabled OR Reduandant Memory Clutch Connectivity Enabled) service fast learn active OR (service fast learn active AND vehicle speed AND vehicle speed max time) high side driver 1 AND high side driver 2 are on following speed sensor DTCs FA: P0721, P077C, P077D following speed sensor DTCs TFTKO: P0722, P0723, P172A, P172B time since last range change (signed vehicle speed OR clutch connectivity fail already active)	= 0 (1 = disabled) = 1 (1 = enabled) = FALSE = TRUE >= 8.0 KPH > 2.5 s = TRUE = FALSE = FALSE >= **Range Change Delay** >= -6.0 AND <= 6.0 = TRUE	OR Illegal Neutral time >= **Illegal Neutral Fail Threshold** OR Illegal Park time >= **Illegal Park Fail Threshold** OR Illegal Reverse time >= **Illegal Reverse Fail Threshold**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			)	**Illegal Reverse Clutch Combinations**				
			Incorrect direction fault detection (converter speed ratio showing capacity OR vehicle speed outside of converter speed ratio window) (Range selected Measured gear ratio Measured ratio delta (not moving towards correct) AND ((Direction by ratio enabled Direction by ratio Direction by ratio vehicle speed met) OR (Direction by clutch slip enabled Direction by clutch slip Direction by clutch slip vehicle speed met	< 0.8 >= 4.0 OR <= -4.0 = Reverse >= 0.4 >= -8.0 = 1 (1 = enabled) = Forward <= -0.5 OR >= 0.5 = 1 (1 = enabled) = Forward <= -0.5 OR >= 0.5	Ratio Detection limit checking enabled (Reduandant Memory Ratio Detection Not Disabled OR Reduandant Memory Ratio Detection Enabled) service fast learn active OR (service fast learn active AND vehicle speed AND vehicle speed max time) high side driver 1 AND high side driver 2 are on following speed sensor DTCs FA: P0716, P0717, P0721, P077C, P077D, P07BF, P07C0, P1783, P17CE following speed sensor DTCs TFTKO: P0722, P0723, P172A, P172B time since last range change	= 1 (1 = enabled) = 0 (1 = disabled) = 1 (1 = enabled) = FALSE = TRUE >= 8.0 KPH > 2.5 s = TRUE = FALSE = FALSE >= **Range Change Delay**	fail percentage increments **RAT - Pct Fail Increase** % per 6.25 ms fail reported for percentage >= 100 % Illegal RAT time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			)					
			)		(			
			)		no shift in progresss	= TRUE		
			OR		OR			
			(		UseRangeShiftSt disabled	= 0 (0 = disabled)		
			Range selected	= Forward	)			
			Measured gear ratio	<= -0.4	engine speed	>= 400.0		
			Measured ratio delta (not moving towards correct)	<= 8.0	(			
					(			
					attained gear not	= Park		
			AND		AND			
			(		attained gear not	= Neutral		
			(		)			
			Direction by ratio enabled	= 1 (1 = enabled)	OR			
					UseAttndGear disabled	= 0 (0 = disabled)		
			Direction by ratio	= Forward	)			
			Direction by ratio vehicle		(			
			speed met	<= -0.5 OR >= 0.5	signed vehicle speed	>= -6.0 AND <= 6.0		
			)		OR			
			OR		ratio detection fail already active	= TRUE		
			(					
			Direction by clutch slip enabled	= 1 (1 = enabled)	)			
					singned vehicle speed	>= -0.5 AND <= 0.5		
			Direction by clutch slip	= Forward				
			Direction by clutch slip		TIS direction not	= unknown		
			vehicle speed met	<= -0.5 OR >= 0.5				
			)		TOSS direction not	= unknown		
			)					
			)					
			Direction by ratio determined by raito within a window (Tolerance Hi / Lo) around expected ratio	**Expected Ratio By Gear** **Ratio Band Tolerance Hi** **Ratio Band Tolerance Lo**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Direction by clutch slip determined by mapping clutches with low slip to effective gear with thosed clutches at low slip C3C4 or C3C6 holding equates to C3 holding C3C4 or C4C6 holding equates to C4 holding C3C6 or C4C6 holding equates to C6 hold	**Clutch Slip Holding Threshold** **Gear by Holding Clutches**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward ≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** =**enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			(raw TOS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward ≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable time	≥ 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	≠ forward ≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						engine speed time for transmission hydraulic pressure available		
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds		
			(raw TOS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range shift state (auto trans shift complete) enable time	= range shift complete ≥ 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	≠ forward ≠ forward ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			raw TOS direction attained gear	≠ forward ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	unintended decel test system fault unintended decel test system fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND unintended deceleration latent fault fail count)) UPDATE unintended decel test system fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE continue execute only IF: calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN SET unintended decel test system fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE ≥ 18.0 KPH ≥ 120.0 seconds = CeTSDD_e_WhlSpdBackUp	unintended decel test system fault time ≥ 10.0 seconds UPDATE unintended deceleration latent fault fail count SET unintended decel test system fault = TRUE unintended deceleration latent fault fail count ≥ 100 counts 25 millisecond update rate	Type A, 1 Trips
			ECM range sensor fault ECM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE	ECM range sensor fault time ≥ 10.0 seconds UPDATE ECM range sensor latent fault fail count SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	AND ECM range sensor latent fault fail count)) UPDATE ECM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= 100 counts	met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF ECM P2802 fault active OR ECM P2803 fault active SET ECM range sensor fault occur = TRUE	 = TRUE ≥ 18.0 KPH ≥ 120.0 seconds = TRUE = TRUE	 ECM range sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			TCM range sensor fault TCM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND TCM range sensor latent fault fail count)) UPDATE TCM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE ≥ 18.0 KPH ≥ 120.0 seconds = TRUE = TRUE	TCM range sensor fault time ≥ 10.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet (*default gear option	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage	= 1 Boolean > 5.00 volts	TOSS fault time ≥ 10.0 seconds UPDATE TOSS latent fault fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			active OR (*default gear option active AND TOSS sensor latent fault fail count)) UPDATE TOSS fault time *default gear option active occurs when emission MIL active due to transmission default gear	 = TRUE = 100 counts	for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on SET TOSS fault occur = TRUE	> 12.5 milliseconds = FALSE = TRUE ≥ 18.0 KPH ≥ 120.0 seconds = TRUE = TRUE	SET TOSS fault = TRUE TOSS latent fault fail count ≥ 100 counts 25 millisecond update rate	
			tie-up fault tie-up fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE tie-up fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE ≥ 18.0 KPH ≥ 120.0 seconds = TRUE = TRUE	tie-up fault time ≥ 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count ≥ 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE trans range fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 200 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF [(P0717 or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P0723 or P077D or P077C or P0722 fault pending or P0716 or P07C0 or P07BF or P0717 fault pending or P172B or P172A or P0721 fault pending or P1783 or P17CE fault active or	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE ≥ 18.0 KPH ≥ 120.0 seconds = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE	trans range fault time ≥ 10.0 seconds UPDATE trans range latent fault fail count SET trans range fault = TRUE trans range latent fault fail count ≥ 200 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P1783 or P17CE fault pending or P172A or P172B test fail this key on or P0721 fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] OR [(P176C or P160E or P0963 or P078F or P0707 fault pending or P18AA fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] SET trans range fault occur = TRUE	= TRUE = TRUE = TRUE = 0 Boolean = 1 Boolean = TRUE = TRUE = 0 Boolean = 1 Boolean		
			tie-up test disable fault tie-up test disable fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up test latent fault fail count)) UPDATE tie-up test latent fault time *default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE ≥ 18.0 KPH ≥ 120.0 seconds	tie-up test latent fault time ≥ 10.0 seconds UPDATE tie-up test latent fault fail count SET tie-up test disable fault = TRUE tie-up test latent fault fail count ≥ 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			occurs when emission		IF			
			MIL active due to		EngineTorqueEstInaccura	= TRUE		
			transmission default gear		te			
					AcceleratorPedalFailure	= TRUE		
					OR			
					CrankSensor_FA	= TRUE		
					OR			
					P2534 fault active	= TRUE		
					OR			
					(P0707 test fail this key	= TRUE		
					on OR			
					P0707 fault active OR	= TRUE		
					P0708 test fail this key on	= TRUE		
					OR			
					P0708 fault active OR	= TRUE		
					P2805 fault active OR	= TRUE		
					P27EE fault active OR	= TRUE		
					P27EB fault active OR	= TRUE		
					P27ED fault active OR	= TRUE		
					P17F7 fault active OR	= TRUE		
					P17F5 fault active OR	= TRUE		
					P17F6 fault active OR	= TRUE		
					P17FC fault active OR	= TRUE		
					P17FA fault active OR	= TRUE		
					P17FB fault active)	= TRUE		
					OR			
					(P0716 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P0717 fault pending, fault	= TRUE		
					active, test fail this key on	= TRUE		
					OR	= TRUE		
					P0721 fault pending, fault			
					active, test fail this key on	= TRUE		
					OR			
					P0722 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR	= TRUE		
					P0723 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR	= TRUE		
					P077B fault pending, fault	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active, test fail this key on OR	= TRUE		
					P077C fault pending, fault active, test fail this key on OR	= TRUE		
					P077D fault pending, fault active, test fail this key on OR	= TRUE = TRUE		
					P07BF fault pending, fault active, test fail this key on OR	= TRUE		
					P07C0 fault pending, fault active, test fail this key on OR	= TRUE		
					P172A fault pending, fault active, test fail this key on OR	= TRUE		
					P172B fault pending, fault active, test fail this key on OR	= TRUE		
					P176B fault pending, fault active, test fail this key on OR	= TRUE		
					P176C fault pending, fault active, test fail this key on OR	= TRUE		
					P176D fault pending, fault active, test fail this key on OR	= TRUE		
					P1783 fault pending, fault active, test fail this key on OR	= TRUE		
					P178F fault pending, fault active, test fail this key on OR	= TRUE		
					P17C4 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C5 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C6 fault pending, fault	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active, test fail this key on OR			
					P17C7 fault pending, fault active, test fail this key on OR	= TRUE		
					P17CC fault pending, fault active, test fail this key on OR	= TRUE		
					P17CD fault pending, fault active, test fail this key on OR	= TRUE		
					P17CE fault pending, fault active, test fail this key on OR	= TRUE		
					P17D3 fault pending, fault active, test fail this key on OR	= TRUE		
					P17D6 fault pending, fault active, test fail this key on)	= TRUE		
					SET tie-up test disable fault occur = TRUE			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Emission neutral default state sets lateral and longitudinal acceleration signal = 0.0 g.	Communication of the Acceleration Sensor Signal ARC from the Acceleration Sensor over CAN bus is incorrect for out of total samples Or Communication of the Acceleration Sensor Signal Checksum from the Acceleration Sensor Sensor over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts >= 2 counts >= 18 counts	Message frame	= Is available	Executes in 10ms loop.	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. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	alive rolling count error counter update fail time 100 millisecond update rate	≥ 3 counts	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time 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 ≥ 0.100 seconds = TRUE ≠ frame alive rolling count data value = TRUE = FALSE	fail time ≥ 10.00 seconds	Emissions Neutral Diagnostics – 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 sensor 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_DualSpdSnsr = **P176B ratio calibration when not REVERSE** see supporting tables = **P176B ratio calibration when REVERSE** see supporting tables ****************************** ≥ **P176B minimum estimated transmission intermediate speed to enable fail evaluation**	fail time ≥ **P176B intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count ≥ **P176B intermediate speed sensor fail count threshold** see supporting tables ****************** delay time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					with	see supporting tables	**P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	
					transmission input speed	≥ **P176B minimum transmission input speed to enable fail evaluation**		
					input speed sensor ready based on commanded gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation)	see supporting tables = **P176B holding clutch states** see supporting tables		
					with			
					with attained gear	= REVERSE OR = 1st thru 10th		
					******************************	******************************		
					transmission input speed	≥ 240.0 RPM		
					transmission output speed	≥ 36.0 RPM		
					range shift state	= range shift complete		
					P0716 fault active	= FALSE		
					P0717 fault active	= FALSE		
					P07BF fault active	= FALSE		
					P07C0 fault active	= FALSE		
					P0722 fault active	= FALSE		
					P0723 fault active	= FALSE		
					P077C fault active	= FALSE		
					P077D fault active	= FALSE		
					P176C fault active	= FALSE		
					P176D fault active	= FALSE		
					battery voltage	≥ 9.00 volts		

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 hydraulic pressure avail	= FALSE ≥ 9.00 volts = TRUE	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 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	≤ 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 = **P176C Enable Boolean** Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ **P176C Fail Timer** seconds, update fail count, fail count ≥ **P176C Fail Count Threshold** counts 6.25 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	**P176D Voltage Fail ≥Threshold** 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 = **P176D Boolean Enable** Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ **P176D Fail Time Threshold** seconds, update fail count, fail count ≥ **P176D Fail Count Threshold** counts 6.25 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Direction Not Plausible - Forward	P1783	The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error.	raw TIS direction AND attained gear	≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			intermediate speed sensor 1 direction raw	**intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality** = **enable calibration**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw)	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND TIS direction AND attained gear	 ≠ FORWARD = REVERSE	engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ≠ predicted direction** **intermediate speed sensor 1 or 2 ≠ predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					trans shift complete)			
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction Not Plausible - Forward	P178F	The intermediate speed sensor 1 is a directional sensor, and raw intermediate speed sensor 1 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 1 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 1 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 1 directional is in error.	intermediate speed sensor 1 direction raw AND attained gear	**intermediate speed sensor 1 or 2 ≠ predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 1 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ≠ predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			intermediate speed sensor 1 direction raw	**intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality** = **enable calibration**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ **intermediate speed sensor 1 or 2 predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			TIS direction) AND attained gear	≠ FORWARD = REVERSE	engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					trans shift complete)			
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 2 Performance	P17C5	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	when: (intermediate speed sensor raw direction when transitional period = FALSE AND intermediate speed sensor raw direction when transitional period = FALSE) OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time	≠ FORWARD ≠ REVERSE ≥ **P17C5 P17D3 intermediate speed sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17C5 fault active OR P17C5 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_DualSpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time < 5.000 seconds 6.25 millisecond update	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 2 Direction Not Plausible - Forward	P17C6	The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error.	intermediate speed sensor 2 direction raw AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 2 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			intermediate speed sensor 2 direction raw	**intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality** = **enable calibration**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ **intermediate speed sensor 1 or 2 predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			TIS direction) AND attained gear	≠ FORWARD = REVERSE	engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					trans shift complete)			
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit Low	P17CC	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sensor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.250 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P17CD fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CC fault active OR P17CC test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate service fast learn, 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 Intermediate Speed Sensor B Circuit High	P17CD	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.750 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P17CC fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CD fault active OR P17CD test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Direction Error	P17CE	The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	input shaft speed sesnor raw direction AND input shaft speed sesnor raw direction when transitional period = FALSE OR input shaft speed sesnor raw when transitional period = TRUE update fail and sample time, update rate defined in Secondary Parameters	≠ FORWARD ≠ REVERSE ≥ 225.0 RPM	determine update rate: 6.25 millisecond update rate calibration, TRUE, update rate = 6.25 millisecond FALSE, update rate = 25 millisecond service mode $04 active diagnostic monitor enable input shaft speed sesnor count sample period senor type cailbration (senor type is directional) P17CE fault active OR P17CE test fail this key on transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= 1 Boolean = FALSE = 1 Boolean ≠ 0 counts = CeTISR_e_Directional = FALSE = FALSE ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time < 5.000 seconds update rate defined in Secondary Parameters	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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_DualSpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time < 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit Range/ Performance	P17D6	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) AND delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration)) update faiil time 25 millisecond update rate	> 10.0 RPM > **P17D6 intermediate speed sensor fail RPM threshold** see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ****************************** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration) with	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr = **P17D6 ratio calibration when not REVERSE** = **P17D6 ratio calibration when REVERSE** ****************************** ≥ **P17D6 minimum estimated transmission intermediate speed to enable fail evaluation**	fail time ≥ **P17D6 intermediate speed sensor fail time threshold** fail time threshold met increments fail count, fail count ≥ **P17D6 intermediate speed sensor fail count threshold** ******************* 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.
					transmission input speed	≥ **P17D6 minimum transmission input speed to enable fail evaluation**	**P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation**	
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with	= **P17D6 holding clutch states**		
					with attained gear	= REVERSE OR = 1st thru 10th		
					******************************	******************************		
					transmission input speed	≥ 240.0 RPM		
					transmission output speed	≥ 36.0 RPM		
					neutral idle mode	= nuetral idle mode ON		
					range shift state	= range shift complete		
					P0716 fault active	= FALSE		
					P0717 fault active	= FALSE		
					P07BF fault active	= FALSE		
					P07C0 fault active	= FALSE		
					P0722 fault active	= FALSE		
					P0723 fault active	= FALSE		
					P077C fault active	= FALSE		
					P077D fault active	= FALSE		
					P17CC fault active	= FALSE		
					P17CD fault active	= FALSE		
					battery voltage	≥ 9.00 volts		
					service fast learn active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					run crank voltage transmission hydraulic pressure	≥ 9.00 volts = TRUE	battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds see supporting tables	

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 TCM run/ crank is active.	Ignition switch Run/Start position circuit low	TCM 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 TCM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	TCM 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, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	≤ 0.5 Ω impedance between signal and controller ground OR ≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive 2 ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count ≥ 6 counts within sample count of 2,400 counts OR open circuit fail count ≥ 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck Off (GR10)	P2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C4 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 2 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 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			

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			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C4 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C4 clutch slip speed valid	= FALSE Boolean = TRUE ≥ 10.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 0.500 seconds	

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 clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810R) clutch pressure control solenoid.				speed calculation)		
					C4 clutch pressured map	= mapped to line pressure, C4 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to GR10 C4 C23467810R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ 10 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C4 off going clutch pressure control ramp time out complete	= TRUE		
					AND			
					off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C4 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C4 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C4 exhaust delay open throttle power on up shift** garage shifts: **C4 exhaust delay garage shift** closed throttle downshift: **C4 exhaust delay closed throttle down shift** negative torque upshift: **C4 exhaust delay negative torque up shift** open throttle downshift: **C4 exhaust delay open throttle power down shift**	
					(engine torque AND	≥ 8,192 Nm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	= 0 (0 is enable, 1 is enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation	= TRUE		
					****************************** conditions needed to trigger test:	******************************		
					(current shift type AND shift type enable cal for current shift type) OR	≠ Garage shift = **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	= 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					******************************	******************************		
					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:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck Off (GR10)	P2723	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C5 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 2 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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			

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			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C5 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C5 clutch slip speed valid	= FALSE Boolean = TRUE ≥ 10.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for	≥ 0.500 seconds	

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 clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (GR10 C1356789) clutch pressure control solenoid.			 C5 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***************************** DTCs not fault pending DTCs not fault active	lever node clutch slip speed calculation) = mapped to line pressure, C5 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millisecond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C5 C1356789 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ 10 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)		
					OR			
					C5 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C5 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C5 exhaust delay open throttle power on up shift** garage shifts: **C5 exhaust delay garage shift** closed throttle downshift: **C5 exhaust delay closed throttle down shift** negative torque upshift: **C5 exhaust delay negative torque up shift** open throttle downshift: **C5 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts**		
						closed throttle downshift: **Clutch Clip Press CD Shifts**		
						negative torque upshift: **Clutch Clip Press NU Shifts**		
						open throttle downshift: **Clutch Clip Press PD Shifts**		
					C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type	≠ Garage shift		
					AND			
					shift type enable cal for current shift type)	= **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active	= FALSE		
					AND			
					shift type enable cal for garage shift	= 1 (0 will enable, 1 will enable)		
					AND			
					Attained Gear	= NEUTRAL OR commanded gear		
					AND			
					(stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777, P0797, P2715, P2724, P2733, P2821.			

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, 10 speed C1356789, or 8 speed C45678R clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, or 8 speed C45678R clutch solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, or 8 speed C45678R clutch solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck Off (GR10)	P2732	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C6 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 2 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 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			

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			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C6 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C6 clutch slip speed valid	= FALSE Boolean = TRUE ≥ 10.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 0.500 seconds	

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 clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C6 GR10 C45678910R clutch pressure control solenoid.				speed calculation)		
					C6 clutch pressured map	= mapped to line pressure, C6 clutch pressure has reached fully applied state		
					(enable forward gear cal AND	= 1 (1 to enable, 0 to disable)		
					driver direction request AND	= FORWARD		
					Attained Gear) OR	= a FORWARD gear		
					(enable reverse gear cal AND	= 0 (1 to enable, 0 to disable)		
					driver direction request AND	= REVERSE		
					Attained Gear)	= REVERSE		
					range shift state	= range shift complete		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

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 NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821	P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		

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 (GR10)	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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					**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millisecond update	
					*****************************	*****************************		
		the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			system-level enables:			
					use battery voltage calibration is FALSE	= 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C6 C45678910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ 10 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C6 off going clutch pressure control ramp time out complete	= TRUE		
					AND			
					off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C6 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C6 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C6 exhaust delay open throttle power on up shift** garage shifts: **C6 exhaust delay garage shift** closed throttle downshift: **C6 exhaust delay garage shift** negative torque upshift: **C6 exhaust delay negative torque up shift** open throttle downshift: **C6 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** clip thresholds for all other shift types:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type)	≠ Garage shift **Clutch Stuck On Shift** = **Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P2724, P2733, P2821.			

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/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1, 10 speed C45678910R clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C45678910R clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10 C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 or GR10 C2 C128910R clutch or CVT primary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 pressure or CVT C1 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 or CVT TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 4.849 % duty cycle	diagnostic monitor enable	= 1 Boolean	PWM fail time ≥ 1.000 seconds out of sample time ≥ 1.500 seconds	Type A, 1 Trips
					P0707 fault active P0708 fault active U0100 fault active ECM internal range sesnor B available from ECM	= FALSE = FALSE = FALSE = TRUE		
					ECM internal range sesnor B fault active	= FALSE		
					battery voltage	≥ 0.00 volts	battery voltage time ≥ 1.000 seconds	
					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	< 1.001 % duty cycle	TCM internal range sesnor A stability time ≥ 1.000 seconds	
					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	< 1.001 % duty cycle	ECM internal range sesnor B stability time ≥ 1.000 seconds	
					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	= ABS(ECM internal range sesnor B raw -		

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, 10 speed Line Pressure Control Circuit, or 8 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	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.60 seconds out of sample time ≥ 0.65 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, or 8 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	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, or 8 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	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 % ≥ 500.0 kPa ≠ TCC control mode current ≠ ON mode (controlled slip mode) ≠ LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean ≥ 500.0 RPM	fail time ≥ 4.000 seconds increment fail count fail count ≥ 3 counts 25 millisecond update rate TCC command capacity time ≥ 0.00 seconds TCC command pressure time ≥ 2.00 seconds engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	≤ 99.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		
					engine torque	≥ 50.0 Nm		
					engine torque	≤ 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(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_Second		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF,		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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 - GR10 specific	P2818	UPDATE UPDATE UPDATE 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.	when: [active clutch control ABS(TCC slip speed) (set point engine speed - engine speed) (maximum engine speed during garage shift - engine speed) engine torque update TCC stuck on fail time garage shift] OR when: [active clutch control ABS(TCC slip speed) engine torque (set point engine speed - engine speed) rate of change of engine speed update TCC stuck on stall pending time]	 = garage shift ≤ 40.0 RPM ≥ 50.0 RPM ≥ 50.0 RPM ≥ 70.0 Nm ≠ garage shift ≤ 30.0 RPM ≥ 90.0 Nm ≥ 200.0 RPM ≤ -2,000.0 RPM/ second	(TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean = 1 Boolean ≥ 500.0 RPM	when: TCC stuck on fail time garage shift ≥ **P2818 TCC stuck on fail time garage shift - GR10** update fail count when: fail count ≥ 3 counts set DTC fault active 25 millisecond update rate when: TCC stuck on stall pending time ≥ **P2818 TCC stuck on fail time stall pending - GR10** when: fail count ≥ 4 counts set DTC fault active 25 millisecond update rate 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.
					service fast learn active	= FALSE	**engine speed time for transmission hydraulic pressure available**	
					battery voltage	≥ 9.00 volts		
					run crank voltage	≥ 9.00 volts		
					P281B falut active	= FALSE	battery voltage time ≥ 0.100 seconds	
					P281D falut active	= FALSE	run crank voltage time ≥ 0.100 seconds	
					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		
					P0746 fault pending	= FALSE		
					P0747 fault pending	= FALSE		
					P0776 fault pending	= FALSE		
					P0777 fault pending	= FALSE		
					P0796 fault pending	= FALSE		
					P0797 fault pending	= FALSE		
					P2714 fault pending	= FALSE		
					P2715 fault pending	= FALSE		
					P2723 fault pending	= FALSE		
					P2724 fault pending	= FALSE		
					P2732 fault pending	= FALSE		
					P2733 fault pending	= FALSE		
					P2820 fault pending	= FALSE		
					P2821 fault pending	= FALSE		
					PRNDL	≠ NEUTRAL		
					PRNDL	≠ REVERSE		
					diagnostic monitor enable	1 Boolean		
					TCC command mode	= OFF		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					transmission fluid	≥ -6.66 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature			
					transmission fluid temperature	≤ 130.00 °C		
					engine torque	≥ -25.0 Nm		
					engine torque	≤ 800.0 Nm		
					P2818 test fail this key on	= FALSE		
					vehicle speed (garage shift)	≤ 4.0 KPH		
					vehicle speed (not garage shift)	≤ 15.0 KPH		
					engine speed	≥ 300.0 RPM		
					engine speed	≤ 850.0 RPM		
					accelerator pedal position	≤ 5.0 %		
					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 AND stuck OFF	= FALSE		
					intrusive shift active	= FALSE		
					TCC solenoid pulse request	= FALSE		
					minumum trubine speed	≤ set point engine speed - 50.0 RPM		
					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, 10 speed TCC Control Circuit, or 8 speed T93 Default Valve Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, or 8 speed Default Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For 8 speed T87a controllers, an open circuit on the Default Valve Control Circuit will also set P281D.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, or 8 speed Default Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid J Stuck Off (GR10)	P2820	Each pressure control solenoid stuck off diagnostic monitor detects a control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default disable valve solenoid failed hydraulically off. The default disable valve is used to route hydraulic fluid to transmission clutches to achieve a hydraulic default gear in the event that a fault occurs which requires the solenoid electrical drivers to be turned off. If the default disable solenoid is hydraulically stuck off, the transmission will enter hydraulic default unintentionally while the control system is actively commanding another gear, which can result in a tie-up condition. When the default disable valve solenoid is hydraulically off while in drive, hydraulic fluid will be routed to clutches to achieve either 7th or 2nd gear. If the vehicle is moving	(gear ratio AND gear ratio) OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	≥ 3.000 ≤ 2.960 ≥ 0.980 ≤ 1.020 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 0.25 seconds 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and the control system is commanding a different gear, the solenoid fault can be detected as either a clutch tie-up or startle mitigation event. Shifting to neutral while monitoring gear ratio will isolate the fault as either a stuck on clutch solenoid or a stuck off default disable valve solenoid. For GR10 non-ETRS applications, the stuck off solenoid can be dected by monitoring transmission input speed deceleration magnitude and timing during a stationary shift into drive from park, neutral, or reverse while commanding neutral.			hydraulic pressure available hydraulic line pressure ***************************** conditions to trigger start of test: (clutch control solenoid test state OR clutch control solenoid test state) Offgoing clutch stuck on test result (for any clutch) Default disable stuck off enable cal for tie-up events current predicted hydraulic default gear if solenoid drivers are turned off (current attained gear OR current attained gear) ***************************** conditions needed through duration of test:	= TRUE ≥ 10.00 kPa ***************************** = Tie Up Test Active = Tie Up Test Hold = Test Failing = 1 (1 to enable, 0 to disable) = a drive gear (i.e. 2nd or 7th gear) = CeCGSR_e_SecondLckd (low gear hydraulic default) = CeCGSR_e_Seventh (high gear hydraulic default) ***************************** = NEUTRAL		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					commanded gear transmission output speed driver direction request ***************************** DTCs not fault pending DTCs not test fail this key on DTCs not fault active	≥ 36.00 RPM = FORWARD ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
			(gear ratio AND	≥ 3.000			fail time ≥ 0.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			gear ratio) OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	≤ 2.960 ≥ 0.980 ≤ 1.020 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					available	= TRUE		
					hydraulic line pressure	≥ 10.00 kPa		
					****************************	*****************************		
					conditions to trigger start of test:			
					(clutch control solenoid test state OR clutch control solenoid test state)	= Tie Up Test Active = Tie Up Test Hold		
					Offgoing clutch stuck on test result (for any clutch)	= Test Failing		
					Default disable stuck off enable cal for tie-up events	= 1 (1 to enable, 0 to disable)		
					(current attained gear OR current attained gear)	= CeCGSR_e_SecondLckd (low gear hydraulic default) = CeCGSR_e_Seventh (high gear hydraulic default)		
					hydraulic default at launch test active	= FALSE		
					*****************************	*****************************		
					conditions needed through duration of test:			
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or 7th gear) = NEUTRAL		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					commanded gear driver direction request ****************************** DTCs not fault pending DTCs not test fail this key on DTCs not fault active	= FORWARD ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
			input speed deceleration	>			fail time ≥ 0.10 seconds observed within:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			transmission output shaft speed update fail time 6.25 millisecond update	**P2820 GR10 hydraulic default input speed deceleration threshold** ≤ 16 RPM	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	**P2820 GR10 hydraulic default at launch test window** 6.25 milliscond update	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic line pressure	≥ 10.00 kPa		
					******************************	******************************		
					conditions needed to trigger test:			
					Driver direction change request	= TRUE		
					default disable stuck off at launch enable cal	= 1 (1 to enable, 0 to disable)		
					ETRS system type	= CeTRGR_e_NoETRS (CeTRGR_e_NoETRS to enable)		
					deceleration test on previous shift into drive failed	= TRUE		
					******************************	******************************		
					conditions needed through duration of test:			
					commanded gear	= NEUTRAL		
					Driver direction request	= FORWARD		
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd)		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		

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 Open (T93 Controller only)	P2824	Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Stall Prevention Active Signal Message Counter Incorrect	P30BD	This DTC monitors for an error in the Engine Stall Prevention Active Signal Message Counter	Communication of the Engine Stall Prevention Active Signal ARC over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame	= Is available	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.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>= 8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the controller 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.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>= 8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the controller 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.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3 counts (equivalent to 800.01 milliseconds) 800.01 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	 > 15,000.00 milliseconds > 11.00 Volts >= 5,000.00 milliseconds > 11.00 Volts <= 18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >= 11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds > 11.00 Volts >= 8.00 Volts 1.00 (1 indicates enabled) >= 11.00 Volts		

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 $0C9 Message $287 Message $3E9 Message $4C1 Message $4D1 Message $4F1	 ≥ 500.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds > 11.00 Volts <= 18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	Message is not received from controller for Message $0C1 Message $0C5 Message $1E9 Message $2F9	≥ 500.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds > 11.00 Volts <= 18.00 Volts	Diagnostic runs in 12.5 ms loop	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	1.00 (1 indicates enabled)		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for Message $0F1 Message $12A Message $1F1 Message $1F3 Message $4E1 Message $4E9	≥ 500.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds > 11.00 Volts <= 18.00 Volts	Diagnostic runs in 12.5 ms loop	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled	1.00 (1 indicates enabled)		
					Or			
					Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	≥ 12,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds > 11.00 Volts <= 18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	1.00 (1 indicates enabled)		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		

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 - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_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_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	1	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	1	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	1	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	1	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	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_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	2	2	2	2	2	2	2	2

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	2	1	1	1	1	2	2	2

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

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

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - 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	1,400.0	1,000.0	500.0	10.0

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_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_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	1	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	1	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	1	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	1	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	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_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	2	2	2	2	2	2	2	2

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	2	1	1	1	1	2	2	2

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

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

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	2	2	2	2	2	2	2	2

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	2	1	1	1	1	2	2	2

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - 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: 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	0.300	0.150	0.150

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

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: 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	0.300	0.150	0.150

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	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0722 OSS Direction Change Delay

Description:

Value Units: seconds
X Unit: DegC

y/x	-40	-20	20
1	5	3	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	-20.000	20.000
1	5.000	3.000	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	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - P176C Enable Boolean

Description:

Value Units: Boolean

y/x	0	1
1	1	1

Initial Supporting table - P176C Fail Count Threshold

Description:

Value Units: Count

y/x	0	1
1	40	40

Initial Supporting table - P176C Fail Timer

Description:

Value Units: seconds
X Unit: intermediate speed sensor index

y/x	0	1
1	0	0

Initial Supporting table - P176D Boolean Enable

Description:

Value Units: Boolean
X Unit: Speed Sensor Index

y/x	0	1
1	1	1

Initial Supporting table - P176D Fail Count Threshold

Description:

Value Units: Count
X Unit: Speed Sensor Index

y/x	0	1
1	40	40

Initial Supporting table - P176D Fail Time Threshold

Description:

Value Units: seconds
X Unit: Speed Sensor Index

y/x	0	1
1	0	0

Initial Supporting table - P176D Voltage Fail Threshold

Description:

Value Units: Volts
X Unit: Speed Sensor Index

y/x	0	1
1	5	5

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: direction commanded
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

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 - C1 exhaust delay closed throttle down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C1 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

Value Units: Clutch Pressure (kPa)
X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	690	690	690	690	690

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C2 exhaust delay closed throttle down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C2 exhaust delay negative torque up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C2 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	500	500

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	0.750	0.750	0.750	0.750

Initial Supporting table - C3 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	575	800

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C4 exhaust delay closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C4 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	400	650	750	800	900

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C5 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	600	700	750	900

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C6 exhaust delay negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C6 exhaust delay open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C6 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	350	650	750	800	950

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Clip Press CD Shifts

Description: Oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	250	400	320	400	400	400

Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts

Description: Oncoming clutch clip pressure for negative torque up shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	450	450	600	450	450

Initial Supporting table - Clutch Clip Press PD Shifts

Description: Oncoming clutch clip pressure for open throttle power down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	500	600	750	750	500

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

Description: Used for closed throttle down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

Description: Used for garage shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

Description: Used for open throttle power down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

Description: Used for powered up shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	1	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0722 OSS Direction Change Delay

Description:

Value Units: seconds
X Unit: DegC

y/x	-40	-20	20
1	5	3	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	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	16,383.8

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - P176C Enable Boolean

Description:

Value Units: Boolean

y/x	0	1
1	1	1

Initial Supporting table - P176C Fail Count Threshold

Description:

Value Units: Count

y/x	0	1
1	40	40

Initial Supporting table - P176C Fail Timer

Description:

Value Units: seconds
X Unit: intermediate speed sensor index

y/x	0	1
1	0	0

Initial Supporting table - P176D Boolean Enable

Description:

Value Units: Boolean
X Unit: Speed Sensor Index

y/x	0	1
1	1	1

Initial Supporting table - P176D Fail Count Threshold

Description:

Value Units: Count
X Unit: Speed Sensor Index

y/x	0	1
1	40	40

Initial Supporting table - P176D Fail Time Threshold

Description:

Value Units: seconds
X Unit: Speed Sensor Index

y/x	0	1
1	0	0

Initial Supporting table - P176D Voltage Fail Threshold

Description:

Value Units: Volts
X Unit: Speed Sensor Index

y/x	0	1
1	5	5

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: direction commanded
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

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 - Clutch Slip Holding Threshold

Description:

Value Units: RPM

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C4	CeTRMR_e_ClchSlipC3C6	CeTRMR_e_ClchSlipC4C6
1	30	30	30	25	25	25

Initial Supporting table - Clutch1 Active Pressure Threshold

Description: Pressure above calculated return spring where clutch is considered active

Value Units: kPa
X Unit: Deg C

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

Initial Supporting table - Clutch2 Active Pressure Threshold

Description: Pressure above calculated return spring where clutch is considered active

Value Units: kPa
X Unit: Deg C

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

Initial Supporting table - Clutch3 Active Pressure Threshold

Description: Pressure above calculated return spring where clutch is considered active

Value Units: kPa
X Unit: Deg C

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

Initial Supporting table - Clutch4 Active Pressure Threshold

Description: Pressure above calculated return spring where clutch is considered active

Value Units: kPa
X Unit: Deg C

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

Initial Supporting table - Clutch5 Active Pressure Threshold

Description: Pressure above calculated return spring where clutch is considered active

Value Units: kPa
X Unit: Deg C

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

Initial Supporting table - Clutch6 Active Pressure Threshold

Description: Pressure above calculated return spring where clutch is considered active

Value Units: kPa
X Unit: Deg C

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

Initial Supporting table - Expected Ratio By Gear

Description:

Value Units: Ratio
X Unit: Gear

Expected Ratio By Gear - Part 1

y/x	CeTRMR_e_GearRev	CeTRMR_e_Gear1	CeTRMR_e_Gear2	CeTRMR_e_Gear3
1	5	5	3	2

Expected Ratio By Gear - Part 2

y/x	CeTRMR_e_Gear4	CeTRMR_e_Gear5	CeTRMR_e_Gear6	CeTRMR_e_Gear7
1	2	1	1	1

Expected Ratio By Gear - Part 3

y/x	CeTRMR_e_Gear8	CeTRMR_e_Gear9	CeTRMR_e_Gear10	
1	1	1	1	

Initial Supporting table - Gear by Holding Clutches

Description:

Value Units: Clutch Holding
X Unit: Gear

Gear by Holding Clutches - Part 1

y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad
CeTSER_e_C1_Clutch	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0
CeTSER_e_C4_Clutch	1	0	0	1
CeTSER_e_C5_Clutch	0	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0

Gear by Holding Clutches - Part 2

y/x	CeTRMR_e_GRX_Gear1Af	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Mc	CeTRMR_e_GRX_Gear1Md
CeTSER_e_C1_Clutch	1	1	1	1
CeTSER_e_C2_Clutch	0	1	1	1
CeTSER_e_C3_Clutch	0	0	1	0
CeTSER_e_C4_Clutch	0	0	0	1
CeTSER_e_C5_Clutch	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0

Gear by Holding Clutches - Part 3

y/x	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3
CeTSER_e_C1_Clutch	1	1	1	1
CeTSER_e_C2_Clutch	1	0	1	0
CeTSER_e_C3_Clutch	0	1	1	1
CeTSER_e_C4_Clutch	0	1	1	1
CeTSER_e_C5_Clutch	1	0	0	1
CeTSER_e_C6_Clutch	1	0	0	0

Gear by Holding Clutches - Part 4

y/x	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6	CeTRMR_e_GRX_Gear7
CeTSER_e_C1_Clutch	1	1	1	0
CeTSER_e_C2_Clutch	0	0	0	0
CeTSER_e_C3_Clutch	1	1	0	1
CeTSER_e_C4_Clutch	1	0	1	1
CeTSER_e_C5_Clutch	0	1	1	1

Initial Supporting table - Gear by Holding Clutches

CeTSER_e_C6_Clutch	1	1	1	1

Gear by Holding Clutches - Part 5

y/x	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	
CeTSER_e_C2_Clutch	1	1	1	
CeTSER_e_C3_Clutch	0	1	1	
CeTSER_e_C4_Clutch	1	0	1	
CeTSER_e_C5_Clutch	1	1	0	
CeTSER_e_C6_Clutch	1	1	1	

Initial Supporting table - Illegal Drive Clutch Combinations

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Description:

Value Units: Clutch Active
X Unit: Illegal Combination
Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

Initial Supporting table - Illegal Drive Fail Threshold

Description:

Value Units: Seconds
X Unit: Deg C

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

Initial Supporting table - Illegal Neutral Fail Threshold

Description:

Value Units: Seconds
X Unit: Deg C

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

Initial Supporting table - Illegal Park Fail Threshold

Description:

Value Units: Seconds
X Unit: Deg C

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

Initial Supporting table - Illegal Park/Neutral Clutch Combinations

Description:

Value Units: Clutch Active
X Unit: Illegal Combination
Y Units: Clutch

Illegal Park/Neutral Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR_e_IllegalPN_1A	CeTRMR_e_IllegalPN_1Ac	CeTRMR_e_IllegalPN_1Ad
CeTRMR_e_C1_Clutch	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0
CeTRMR_e_C4_Clutch	1	0	0	1
CeTRMR_e_C5_Clutch	0	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Park/Neutral Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalPN_1Af	CeTRMR_e_IllegalPN_1M	CeTRMR_e_IllegalPN_1Mc	CeTRMR_e_IllegalPN_1Md
CeTRMR_e_C1_Clutch	1	1	1	1
CeTRMR_e_C2_Clutch	0	1	1	1
CeTRMR_e_C3_Clutch	0	0	1	0
CeTRMR_e_C4_Clutch	0	0	0	1
CeTRMR_e_C5_Clutch	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Park/Neutral Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3
CeTRMR_e_C1_Clutch	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	1	0
CeTRMR_e_C3_Clutch	0	1	1	1
CeTRMR_e_C4_Clutch	0	1	1	1
CeTRMR_e_C5_Clutch	1	0	0	1
CeTRMR_e_C6_Clutch	1	0	0	0
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Park/Neutral Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IllegalPN_6	CeTRMR_e_IllegalPN_7
CeTRMR_e_C1_Clutch	1	1	1	0
CeTRMR_e_C2_Clutch	0	0	0	0

Initial Supporting table - Illegal Park/Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	1	0	1
CeTRMR_e_C4_Clutch	1	0	1	1
CeTRMR_e_C5_Clutch	0	1	1	1
CeTRMR_e_C6_Clutch	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Park/Neutral Clutch Combinations - Part 5

y/x	CeTRMR_e_IllegalPN_8	CeTRMR_e_IllegalPN_9	CeTRMR_e_IllegalPN_10	
CeTRMR_e_C1_Clutch	0	0	0	
CeTRMR_e_C2_Clutch	1	1	1	
CeTRMR_e_C3_Clutch	0	1	1	
CeTRMR_e_C4_Clutch	1	0	1	
CeTRMR_e_C5_Clutch	1	1	0	
CeTRMR_e_C6_Clutch	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description:

Value Units: Clutch Active
X Unit: Illegal Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR_e_IllegalRev_1Ac	CeTRMR_e_IllegalRev_1Ad	CeTRMR_e_IllegalRev_1Af
CeTRMR_e_C1_Clutch	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0
CeTRMR_e_C3_Clutch	0	1	0	0
CeTRMR_e_C4_Clutch	0	0	1	0
CeTRMR_e_C5_Clutch	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Mc	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf
CeTRMR_e_C1_Clutch	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1
CeTRMR_e_C3_Clutch	0	1	0	0
CeTRMR_e_C4_Clutch	0	0	1	0
CeTRMR_e_C5_Clutch	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1
CeTRMR_e_C2_Clutch	0	1	0	0
CeTRMR_e_C3_Clutch	1	1	1	1
CeTRMR_e_C4_Clutch	1	1	1	1
CeTRMR_e_C5_Clutch	0	0	1	0
CeTRMR_e_C6_Clutch	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Reverse Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8
CeTRMR_e_C1_Clutch	1	1	0	0
CeTRMR_e_C2_Clutch	0	0	0	1

Initial Supporting table - Illegal Reverse Clutch Combinations

CeTRMR_e_C3_Clutch	1	0	1	0
CeTRMR_e_C4_Clutch	0	1	1	1
CeTRMR_e_C5_Clutch	1	1	1	1
CeTRMR_e_C6_Clutch	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0

Illegal Reverse Clutch Combinations - Part 5

y/x	CeTRMR_e_IllegalRev_9	CeTRMR_e_IllegalRev_10		
CeTRMR_e_C1_Clutch	0	0		
CeTRMR_e_C2_Clutch	1	1		
CeTRMR_e_C3_Clutch	1	1		
CeTRMR_e_C4_Clutch	0	1		
CeTRMR_e_C5_Clutch	1	0		
CeTRMR_e_C6_Clutch	1	1		
CeTRMR_e_C7_Clutch	0	0		

Initial Supporting table - Illegal Reverse Fail Threshold

Description:

Value Units: Seconds
X Unit: Deg C

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

Initial Supporting table - Range Change Delay

Description: Time to delay monitor after range change

Value Units: Seconds
X Unit: Deg C

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

Initial Supporting table - RAT - Pct Fail Increase

Description:

Value Units: Pct
X Unit: Deg C

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

Initial Supporting table - Ratio Band Tolerance Hi

Description:

Value Units: Ratio
X Unit: Gear

Ratio Band Tolerance Hi - Part 1

y/x	CeTRMR_e_GearRev	CeTRMR_e_Gear1	CeTRMR_e_Gear2	CeTRMR_e_Gear3
1	0	0	0	0

Ratio Band Tolerance Hi - Part 2

y/x	CeTRMR_e_Gear4	CeTRMR_e_Gear5	CeTRMR_e_Gear6	CeTRMR_e_Gear7
1	0	0	0	0

Ratio Band Tolerance Hi - Part 3

y/x	CeTRMR_e_Gear8	CeTRMR_e_Gear9	CeTRMR_e_Gear10	
1	0	0	0	

Initial Supporting table - Ratio Band Tolerance Lo

Description:

Value Units: Ratio
X Unit: Gear

Ratio Band Tolerance Lo - Part 1

y/x	CeTRMR_e_GearRev	CeTRMR_e_Gear1	CeTRMR_e_Gear2	CeTRMR_e_Gear3
1	0	0	0	0

Ratio Band Tolerance Lo - Part 2

y/x	CeTRMR_e_Gear4	CeTRMR_e_Gear5	CeTRMR_e_Gear6	CeTRMR_e_Gear7
1	0	0	0	0

Ratio Band Tolerance Lo - Part 3

y/x	CeTRMR_e_Gear8	CeTRMR_e_Gear9	CeTRMR_e_Gear10	
1	0	0	0	

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Control Module Sensor Reference Voltage 1 Low Voltage	P1018	UTLC Sensor 5V supply is low	Quality sensor power supply	<= 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,2 s Failure out of 20 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 1 High Voltage	P1019	UTLC Sensor 5V supply is high	Quality sensor power supply	>= 5,25V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,2 s Failure out of 20 samples Time basis = 10ms	Type A, 1 Trip
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	Checks if the alive rolling counts in messages received from the ECM are pertinent	The alive counter of CAN1 shall pursue this pattern OR	≠ {0;1;2;3;0}	Sensor Bus Wakeup No DCU internal fault	= Active P20FF & P10F4	5 s Failure out of 10 to 200 samples Depends on CAN message transmit time. Diagnostic checks every received message (25ms, 100ms or 500ms). Depends on CAN message transmit time.	Type A, 1 Trip
			The alive counter of CAN2 shall pursue this pattern OR	≠ {0;1;2;3;0}				
			The alive counter of CAN3 shall pursue this pattern OR	≠ {0;1;2;3;0}				
			The alive counter of CAN4 shall pursue this pattern OR	≠ {0;1;2;3;0}				
		Checks if the transmitted message checksum equals the calculated checksum for messages received from the ECM	Checksum of the message of CAN1 OR	≠ computed cheksum				
			Checksum of the message of CAN2 OR	≠ computed cheksum				
			Checksum of the message of CAN3 OR	≠ computed cheksum				
			Checksum of the message of CAN4	≠ computed cheksum				
Reductant Control Module Sensor Reference Voltage 2 Low Voltage	P10C9	Reductant pressure sensor 5V supply is low	Pressure sensor power supply	<= 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 2 High Voltage	P10CA	Reductant pressure sensor 5V supply is high	Pressure sensor power supply	>= 5,25V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Heater 1 Control Circuit Shorted	P10D9	Detects if at least one heater high side and low side are shorted together	(Low side FET drain OR load current) AND **Error counter** Note: If a fault occurs with the heater on, the heater will be commanded off by the driver but cannot be pin-pointed. The driver cannot detect which heater is faulted. In Off state the circuit shorted ADC range is indistinguishable from normal state indicated below: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note2: If the normal ADC state is indicated in the off state, then the heater is commanded on again. A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the **Error counter** threshold.	> 0,45V (MHE) > 95A (MHE) > 4 < 0,909V > 0,767V < 0,613V > 0,487V	Sensor Bus or Accessory or Ignition Run/Crank Heater power supply voltage No DCU internal fault At least one heater PWM command Note: Heaters power command is forced to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high >5,7V P20FF & P10F4 Different from zero P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1,2 s Failure out of 4 samples Success out of 12 samples Time basis = 100ms Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type B, 2 Trips
Reductant Control Module Ignition On/Start Switch Circuit High Voltage	P10DA	Run/crank wire input is high, when it is expected to be low	R/C wire state AND Serial data (GMLAN) R/C state	= HIGH = LOW	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	3 s Failure out of 300 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Ignition On/Start Switch Circuit Low Voltage	P10DB	Run/crank wire input is low, when it is expected to be high	R/C wire state AND Serial data (GMLAN) R/C state	= LOW = HIGH	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	3 s Failure out of 300 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Heater Supply Circuit Low	P10DC	Tank heater supply voltage is lower than DEF system voltage	Raw permanent power supply voltage - Raw tank heater power supply	> 3,3V	Sensor Bus or Accessory or Ignition Run/Crank Propulstion System Active Application software has been running for a timer Engine cranking (serial data) After-run sequence No DCU internal fault	= Active = Active > 510ms = False = Not active P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type B, 2 Trips
Reductant Control Module Heater Supply Circuit High	P10DD	Tank heater supply voltage is greater than DEF system voltage	Raw tank heater power supply - Raw permanent power supply voltage	> 3,3V	Sensor Bus or Accessory or Ignition Run/Crank Propulstion System Active Application software has been running for a timer After-run sequence No DCU internal fault	= Active = Active > 510ms = Not active P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type B, 2 Trips

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 2 Control Circuit Shorted	P10F3	Detects if at least one heater high side and low side are shorted together	(Low side FET drain OR load current) AND **Error counter** Note: If a fault ocurrs with the heater on, the heater will be commanded off by the driver but cannot be pin-pointed. The driver cannot detect which heater is faulted. In Off state the circuit shorted ADC range is indistinguishable from normal state indicated below: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note2: If the normal ADC state is indicated in the off state, then the heater is commanded on again. A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the **Error counter** threshold.	> 0,45V (MHE) > 95A (MHE) > 4 < 0,909V > 0,767V < 0,613V > 0,487V	Sensor Bus or Accessory or Ignition Run/Crank Heater power supply voltage No DCU internal fault At least one heater PWM command: Note: Heater power command are forced to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high >5,7V P20FF & P10F4 Different from zero P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1,2 s Failure out of 4 samples Success out of 12 samples Time basis = 100ms Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type B, 2 Trips
Reductant Control Module Not Programmed	P10F4	Checks if service part has been reprogrammed with application specific sofware and calibration	**software operational reference calibration** AND MEC Note: **Software operational reference calibration** is set to true if application specific calibration has been flashed.	= FALSE = 0	Sensor Bus or Accessory or Ignition Run/Crank	any of the three wake up signals is high	No debounce applied Once at initialization	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 3 Low Voltage	P131B	Reductant temperature sensor 5V supply is low	Temperature sensor power supply	<= 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 3 High Voltage	P131C	Reductant temperature sensor 5V supply is high	Temperature sensor power supply	>= 5,25V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Heater 3 Control Circuit Shorted	P143C	Detects if at least one heater high side and low side are shorted together	(Low side FET drain OR load current) AND **Error counter** Note: If a fault occurs with the heater on, the heater will be commanded off by the driver but cannot be pin-pointed. The driver cannot detect which heater is faulted. In the Off state the circuit shorted ADC range is indistinguishable from normal state indicated below: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note2: If the normal ADC state is indicated in the off state, then the heater is commanded on again. A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the **Error counter** threshold.	> 0,45V (MHE) > 95A (MHE) > 4 < 0,909V > 0,767V < 0,613V > 0,487V	Sensor Bus or Accessory or Ignition Run/Crank Heater power supply voltage No DCU internal fault At least one heater PWM command: Note: Heater power command are forced to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high >5,7V P20FF & P10F4 Different from zero P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1,2 s Failure out of 4 samples Success out of 12 samples Time basis = 100ms Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type B, 2 Trips
Reductant Pump Resistance Performance	P149F	Checks if the pump resistance is too low during the pump heating phase.	Pump driver power supply * duty cycle / driver current measure OR	< 0,23Ω	Sensor Bus or Accessory or Ignition Run/Crank Pump state AND Driver current measure Note: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Pump heating : $0 Pressure Control Not running > 0 P204B & P204C & P204D & P204E P204F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB P20FF & P10F4	8 s Failure out of 800 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
		Checks if the pump resistance is too high during the pump heating phase.	Pump driver power supply * duty cycle / driver current measure	> 0,8Ω				

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Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Level Sensor Circuit Range/Performance	P203B	Level measurements are not available when they should be available.	Level message **readiness** bit Note: The level **Readiness** is transmitted by the UTLC and is an indicator of level information availability.	= FALSE	Sensor Bus or Accessory or Ignition Run/Crank (**Refill / draining** has not been detected for a timer AND Estimated DEF Level AND **Slosh** AND Urea temperature AND Secondary temperature AND Tank heating AND **Tank agitation flag** AND Vehicle speed) No Level Sensor voltage fault No SENT communication fault No DCU internal fault See **"Level & Quality Performance"** sheet for parameters definition	any of the three wake up signals is high > 300s > 5L = False above slush threshold = 0°C above slush threshold = 3°C Tank is not heating = True > 2km/h P203C & P203D U2627 & U2628 & U2630 P20FF and P10F4	200s Failure out of 2000 samples Success out of 6 samples Time basis = 100ms	Type B, 2 Trips
Reductant Level Sensor Circuit Low Voltage	P203C	Measured level sensor signal is out of range low	[PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: 1. All related signals are directly transmitted by UTLC. 2. PZT conditions are based on a single diagnosis status	> 5,5V < 4,5V > 2V < 0,125V	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type B, 2 Trips
Reductant Level Sensor Circuit High Voltage	P203D	Measured level sensor signal is out of range high	UTLC level measurement AND Level readiness bit	> 400 mm = TRUE	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	6 s Failure out of 12 samples Sucess out of 4 samples Time basis = 500ms	Type B, 2 Trips
Reductant Pressure Sensor Performance	P204B	Reductant pressure offset from ambient pressure is too low	Pressure value OR Time when debounce counter has not reached pass/fail limits	< -200 mbar >1s (timeout)	Sensor Bus or Accessory or Ignition Run/Crank Pump state No Pressure Sensor fault No DCU internal fault	any of the three wake up signals is high Pump start-up: $0 Pressure Control Not running P204C & P204D & P204E P20FF & P10F4	Up to 33 s (3X 1s timeout + 2*15s wait) Malfunction criteria confirmation out of 88 samples Time basis = 10ms Failure confirmation after **two retries** Recovery only at next driving cycle **Note**: See "**Repeat Defrost**" sheet for retries definition	Type A, 1 Trip
		Reductant pressure offset from ambient pressure is too high	Pressure value OR Time when debounce counter has not reached pass/fail limits	> 200 mbar > 1s (timeout)				
Reductant Pressure Sensor Circuit Low Voltage	P204C	Measured pressure sensor signal is out of range low	Pressure sensor signal voltage Note: Pressure sensor signal = -0,5bar when Pressure sensor signal voltage = 0,47V	< 0,45V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Pressure Sensor Circuit High Voltage	P204D	Measured pressure sensor signal is out of range high	Pressure sensor signal voltage Note: Pressure sensor signal = 9bar when Pressure sensor signal voltage = 4,7V	> 4,9V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Pressure Sensor Circuit Intermittent/Erratic	P204E	Reductant pressure signal is changing too quickly	ABS[Pressure sensor signal(t) - pressure sensor signal (t - sample time)] / sample time	> 100bar/s	Sensor Bus or Accessory or Ignition Run/Crank Application software has been running for a timer No Pressure Sensor fault No DCU internal fault	any of the three wake up signals is high >510ms P204C & P204D P20FF & P10F4	0,05 s Failure out of 5 samples Time basis = 10ms	Type A, 1 Trip
Reductant Tank Temperature Sensor Performance	P205B	Reductant temperature sensor offset from a startup reference temperature is too low after a sufficient off period	**Average engine startup reference temperature** - tank temperature sensor OR Note: **Average engine startup reference temperature** is transmitted by the ECM, It represents the average value of a minimum of 4 valid temperature following a minimum engine off period and other temperature stabilization criteria.	>= 30°C	Sensor Bus Wake up [**Average engine startup reference temperature mask** AND Time during which DEF-C application software is running AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor fault No CAN communication fault No DCU internal fault Note: **Average engine start-up reference temperature mask** is set to true if : Engine off time ≥ 8hrs AND At least 4 sensors used in average engine startup reference temperature are valid)	= Active = "Use Data" > 1s < 3,5 s P205C & P205D & P205E U2412 & U2626 & P10C6 & P21CB P20FF and P10F4	0,3 s Failure out of 3 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
		Reductant temperature sensor offset from a startup reference temperature is too high after a sufficient off period	Tank temperature sensor - **Average engine startup reference temperature** Note: **Average engine startup reference temperature** is transmitted by the ECM, It represents the average value of a minimum of 4 valid temperature following a minimum engine off period and other temperature stabilization criteria.	>= 30°C				
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	Measured temperature sensor signal is out of range low	Temperature sensor signal voltage Note: Temperature sensor signal = 75°C when Temperature sensor signal voltage = 0,31V	< 0,3 V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Tank Temperature Sensor Circuit High Voltage	P205D	Measured temperature sensor signal is out of range high	Temperature sensor signal voltage Note: Temperature sensor signal = -40°C when Temperature sensor signal voltage = 4,7V	> 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Tank Temperature Sensor Circuit Erratic	P205E	Measured temperature sensor signal is intermittent	ABS[Tank temperature sensor signal(t) - tank temperature sensor signal (t - sample time)] / sample time	> 100°C/s	Sensor Bus or Accessory or Ignition Run/Crank No Tank Temperature Sensor fault No DCU internal fault	any of the three wake up signals is high P205C & P205D P20FF & P10F4	0,5 s Failure out of 5 samples Time basis = 100ms	Type A, 1 Trip
Reductant Quality Sensor Circuit Range/Performance	P206B	Quality measurements are not available when they should be available.	Quality message **readiness** bit Note: The quality **Readiness** is transmitted by the UTLC and is an indicator of level information availability.	FALSE	Sensor Bus or Accessory or Ignition Run/Crank (**Refill / draining** has not been detected for a timer AND Estimated DEF Level AND **Slosh** AND Urea temperature AND Secondary temperature AND Tank heating AND **Tank agitation flag** AND Vehicle speed No Level Sensor voltage fault No SENT communication fault No DCU internal fault See **"Level & Quality Performance"** sheet for parameters definition	any of the three wake up signals is high > 300s > 5L = False above slush threshold = 0°C above slush threshold = 3°C Tank is not heating = TRUE > 2km/h P203C & P203D U2627 & U2628 & U2630 P20FF & P10F4	60 s Failure out of 600 samples Success out of 40 samples Time basis = 100ms	Type A, 1 Trip
Reductant Quality Sensor Circuit Low	P206C	Measured quality sensor signal is out of range low	[(UTLC quality measurement AND Quality readiness bit) OR PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: 1. All related signals are directly transmitted by UTLC. 2. PZT conditions are based on a single diagnosis status bit transmitted by the sensor	< 0% TRUE > 5,5V < 4,5V > 2V < 0,125V	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Quality Sensor Circuit High Voltage	P206D	Measured quality sensor signal is out of range high	UTLC quality measurement AND Quality readiness bit Note: Quality measurement >threshold is done inner DEF-C application software	> 63,5% TRUE	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Pump Control Circuit	P208A	Checks if one pump motor phase is not connected	Off-line: Driver device status register 7 value is On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	[1 0 1 0 1 1] OR [1 1 1 0 1 1] OR [1 0 1 1 1 1]	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Pump Performance	P208B	Detects if there is a pump speed error	abs(Pump speed measured - pump speed set point)	> 712 rpm	Sensor Bus or Accessory or Ignition Run/Crank Pump state No DCU internal fault Note1: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2: Pump in Priming OR Run OR After-Run correspond to $1=Pressure Control Refill Pipeline OR $2=Pressure Build Up OR $4=Pressure Closed Loop Control OR $5=Pressure Open Loop Control OR $7=Afterrun Wait Temperature Decrease OR $8=Afterrun Purge Pipeline	any of the three wake up signals is high Pump in Priming OR Run OR After-Run P20FF & P10F4 P204B & P204C & P204D & P204E P204F & P149F & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	63 s (2X 15s fail to stabilize timeout + 2*15s wait time + 3s pump blocked confirmation) Malfunction criteria confirmation out of 300 samples Time basis = 10ms Failure confirmation after **two retries**. Between two retries, pump is stopped for 15s. When pressure hold is achieved, retries are no longer permitted and an effective retry is counted after 3s with the malfunction criteria met. Success is reported after maximum time that would be required to mature a fault has elapsed. Recovery is possible only on the next driving cycle Note: See "**Repeat Defrost**" sheet for retries definition	Type A, 1 Trip

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Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Pump Control Circuit Low Voltage	P208C	Checks if one pump motor phase is shorted to ground	Off-line: Driver device status register 7 value is On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	[0 1 0 1 0 1]	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Pump Control Circuit High Voltage	P208D	Checks if one pump motor phase is shorted to power.	Off-line: Driver device status register 7 value is On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	[1 0 1 0 1 0]	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 1 Control Circuit	P20B9	Detects an open circuit on the tank heater control (+) or (-) circuit.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 1,083V > 0,926V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 1 Performance	P20BA	Detects if the tank heater resistance or power is outside operating thresholds.	Tank heater sides voltage difference / heater current OR Tank heater sides voltage difference / heater current OR Tank heater power command - Tank heater power OR Tank heater power - Tank heater power command	< 1Ω > 1,8Ω > 45W > 45W	Sensor Bus or Accessory or Ignition Run/Crank Tank heater PWM command No DCU internal fault Note: Tank heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 100ms Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 1 Control Circuit Low Voltage	P20BB	Detects if the tank heater control (+) or (-) circuit is shorted to ground.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 0,601V > 0,506V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 1 Control Circuit High Voltage	P20BC	Detects if the tank heater control (+) or (-) circuit is shorted to power	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 4,168V > 2,021V < 4,325V > 2,097V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Control Circuit	P20BD	Detects an open circuit on the line heater control (+) or (-) circuit.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 1,083V > 0,926V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
			Line heater sides voltage difference / heater current OR	< 2,9Ω	Sensor Bus or Accessory or Ignition Run/Crank Line heater PWM command: No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4	8 s Failure out of 80 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 2 Performance	P20BE	Detects if the line heater resistance or power is outside operating thresholds.	Line heater sides voltage difference / heater current OR Line heater power command - Line heater power OR Line heater power - Line heater power command	> 7,5Ω > 16W > 16W	Note: Line heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P221C & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	10 s Failure out of 100 samples Time basis = 100ms Recovery only at next driving cycle	
Reductant Heater 2 Control Circuit Low Voltage	P20BF	Detects if the line heater control (+) or (-) circuit is shorted to ground.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 0,601V > 0,506V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Control Circuit High Voltage	P20C0	Detects if the line heater control (+) or (-) circuit is shorted to power	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 4,168V > 2,021V < 4,325V > 2,097V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF an&d P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 3 Control Circuit/Open	P20C1	Detects an open circuit on the tank heater 2 control (+) or (-) circuit.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 1,083V > 0,926V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 3 Control Circuit Performance	P20C2	Detects if the tankheater 2 resistance or power is outside operating thresholds.	Tank heater 2 sides voltage difference / heater current OR Tank heater 2 sides voltage difference / heater current OR Tank heater 2 power command - Tank heater 2 power OR Tank heater 2 power - Tank heater 2 power command	< 0,9Ω > 1,6Ω > 52W > 52W	Sensor Bus or Accessory or Ignition Run/Crank Tank heater 2 PWM command No DCU internal fault Note: Tank heater 2 power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 100ms Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 3 Control Circuit Low	P20C3	Detects if the tank heater 2 control (+) or (-) circuit is shorted to ground.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 0,601V > 0,506V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 3 Control Circuit High	P20C4	Detects if the tank heater 2 control (+) or (-) circuit is shorted to power	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 4,168V > 2,021V < 4,325V > 2,097V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Low Pressure	P20E8	Detects if reductant pressure is too low.	Pressure setpoint - pump pressure signal	>= 630mbar	Sensor Bus or Accessory or Ignition Run/Crank Pump state **Estimated DEF Level** No DCU internal fault Note1: Pump is forced to stop if: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault No DCU internal fault Note2: Pump in pressure hold corresponds to $4=Pressure Closed Loop Control Note3: When **estimated DEF level** is below the diagnostic enable (reporting threshold) noted above and the malfunction criteria is greater than 2bar continiously during 5s, then "Reductant Tank Empty" flag is set, impacting low reductant driver warning and inducement.	any of the three wake up signals is high Pump in Pressure hold > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P204F & P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	30 s Failure out of 3000 samples Success out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant High Pressure	P20E9	Detects if reductant pressure is too high.	Pump pressure signal - pressure setpoint	>= 630mbar	Sensor Bus or Accessory or Ignition Run/Crank Pump state Engine Auto Stop Active No DCU internal fault Note1: Pump is forced to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2: Pump in run corresponds to $1=Pressure Control Refill Pipeline, $2=Pressure Build Up, $4=Pressure Closed Loop Control and $5=Pressure Open Loop Control	any of the three wake up signals is high Pump in Run = False P20FF & P10F4 P204B & P204C & P204D & P204E P204F & P208B & P149F & P20E8 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Control Module Performance	P20FF	RAM pattern test fail	After writting a checker-board type pattern of 0's and 1's into the cells of a bit-oriented memory, difference is found between any cells' expected contents Note: this test is handle with RamTst Vector module, using checkerboard algorithm		Sensor Bus or Accessory or Ignition Run/Crank	any of the three wake up signals is high	No debounce applied Once at initialization	Type A, 1 Trip
		Dataset version does not fit the SW version	Computed checksum OR software operational reference calibration is incompatible to the application software	!= stored frame checksum				
		Persistent data error in Non-Volatile Memory	Aborded write operation is detected on applied Nvm blocks OR Calculated checksums of related Nvm blocks Note: Apply on Application data & IUMPR data Nvm blocks	!= stored checksums				
		Any data stored in Non-Volatile Memory is inconsistent	Aborded write operation is detected on applied blocks OR computed data checksum of related Nvm blocks OR Heater calibration are not learned during EOL Note: Apply on Heater calibration Nvm blocks	!= stored data checksum				
Reductant Pump High Current	P214E	Checks if the pump motor phase current exceeds the max operating limit current	If pump hardware protection OR (If Pump State = Heating Pump motor current Else Pump motor current)	= active > 15A > 7A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 1 sample in case pump hardware protection is detected. Else, failure out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 1 High Current	P214F	Detects if the tank heater driver output current is above the maximum limit current	Tank heater current	> 15A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips

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Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Level Sensor 1 Stuck	P21C5	Reductant level sensor signal is unchanging in conditions where some change is expected	Level sensor signal(t) - Level sensor signal (t - 1000ms)	< 0,25 mm	Sensor Bus Wakeup or Accessory or Ignition Run/Crank **[[Vehicle speed** *(see note1)* AND **Vehicle speed validity** AND **Urea state]** AND Level readiness bit] *(see note2)* AND Estimated DEF Level No Level Sensor 1 faults No Tank Temperature Sensor A faults No CAN communication faults No SENT communication faults No DCU internal faults Note1: after minimum required vehicle speed is reached, related condition will be set at false when speed threshold is not reached on two continious samples. Note2: Conditions under bracket shall be continiously set for 600ms to enable the diagnostic. After being met, diagnostic is deactivated as soon as one condition is unmet. Note3: See "**Level & Quality Performance**" sheet for parameters definition	= Asserted ≥ 25km/h = True = liquid = True > 5L P203B & P203C & P203D & P131B & P131C P205B & P205C & P205D & P205E U2412 & U2626 & P10C6 & P21CB U2627 & U2628 & U2630 P20FF and P10F4	200s Failure out of 200 samples Sucess out of 1 sample Time basis = 1000ms	Type B, 2 Trips
Reductant Control Module Supply Voltage Low Voltage	P21CB	Measured permanent power supply voltage is low compared to the vehicle system voltage (received by serial data from ECM)	ECM (Serial Data) Voltage - permanent power supply voltage	> 3V	Sensor Bus Wake up Engine cranking (serial data) Engine Controller Sensed Powertrain Relay Voltage Mask No DCU internal fault	= Active = False = True P20FF & P10F4	3 s Failure out of 300 samples Time basis = 10ms	Type B, 2 Trips
Reductant Heater 1 Low Current	P21DD	Detects if the tank heater driver output current is below the minimum limit current	Tank heater current	< 0,75A	Sensor Bus or Accessory or Ignition Run/Crank Tank heater PWM command No DCU internal fault Note: Tank heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Low Current	P221C	Detects if the line heater driver output current is below the minimum limit current	Line heater current	< 0,75A	Sensor Bus or Accessory or Ignition Run/Crank Line heater PWM command: No DCU internal fault Note: Line heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 High Current	P221D	Detects if the line heater driver output current exceeds the max operating limit current	Line heater current	> 15A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips

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Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 3 Current Too Low	P221E	Detects if the tank heater 2 driver output current is below the minimum limit current	Tank heater 2 current	< 0,75A	Sensor Bus or Accessory or Ignition Run/Crank Tank heater 2 PWM command No DCU internal fault Note: Tank heater 2 power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P20C2 & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 3 Current Too High	P221F	The tank heater 2 driver output current exceeds the max operating limit current	Tank heater 2 current	> 15A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Excessive Time To Enter Closed Loop Reductant Injection Control	P249C	Detects if pressure build does not achieve desired target in time	**Pressure hold** AND [Total time from the start of line filling OR Total time from the exit of Start & Stop] Note: See "Repeat defrost" section for Pressure hold definition	!= active > 15s > 7,5s	Sensor Bus or Accessory or Ignition Run/Crank Pump state **Estimated DEF Level** No DCU internal fault Note1: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2: Pump in Priming OR Pressure build-Up corresponds to $1=Pressure Control Refill Pipeline OR $2=Pressure Build Up Note3: When **estimated DEF level** is below the diagnostic enable (reporting threshold) noted above and the failure is confirmed after 1 retry, then "Reductant Tank Empty" flag is set, impacting low reductant driver warning and inducement.	any of the three wake up signals is high Pump Priming OR Pressure built-Up > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P149F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P204F P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	75 s (3X 15s timeout + 2*15s wait) Malfunction criteria confirmation out of 1500 samples Time basis = 10ms Failure confirmation after **two retries.** Between two retries, pump is stopped for15s. Success is reported after maximum time that would be required to mature a fault has elapsed without the malfunction criteria being met. Recovery only at next driving cycle Note: See "**Repeat Defrost**" sheet for retries definition	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit Range/Performance	P2ADA	Measured UTLC temperature sensor is offset high	Secondary device temperature information - tank temperature sensor OR	>= 21°C	Sensor Bus Wake up [(**Average engine startup reference temperature mask** OR Service Tamper Bay test request) AND Time during which DEF-C application software is running AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor A fault No Tank Temperature Sensor B fault No SENT communication fault No DCU internal fault Note: **Average engine start-up reference temperature mask** is set to "Use Data" if : Engine Off Time Powertrain High Resolution AND At least 4 sensors used in average engine startup reference temperature are valid)	= Active = "Use Data" > 1s < 3,5 s P205B & P205C & P205D & P205E P2ADDP2ADB & P2ADC U2627 & U2628 & U2630 P20FF and P10F4 ≥ 8hrs	3 s Failure out of 6 samples Time basis = 500ms Recovery only at next driving cycle	Type A, 1 Trip
		Measured UTLC temperature sensor is offset low	Tank temperature sensor - secondary device temperature information	>= 21°C				
Reductant Tank Temperature Sensor B Circuit Low	P2ADB	Measured UTLC temperature sensor is out of range low	UTLC temperature measurement	< -50°C	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit High	P2ADC	Measured UTLC temperature sensor is out of range high	UTLC temperature measurement	> 90°C	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit Intermittent/Erratic	P2ADD	Measured temperature sensor signal gradient exceeds the expected value by intermittence	ABS[secondary device temperature sensor signal(t) - secondary device temperature sensor signal (t - 1,3s)]	> 8°C/1300ms	Sensor Bus or Accessory or Ignition Run/Crank No Tank Temperature Sensor B voltage fault No SENT communication fault No DCU internal fault	any of the three wake up signals is high P2ADB & P2ADC U2627 & U2628 & U2630 P20FF & P10F4	3,9 s Failure out of 3 samples Time basis = 1300ms	Type A, 1 Trip

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Pump Low Current	P2C11	Checks if the pump motor phase current is below the minimum operating current	If Pump State = Heating Pump motor current Else if (Pump State = Priming OR Run) Pump motor current	< 0,75A < 0,5A	Sensor Bus or Accessory or Ignition Run/Crank Pump state AND Pressure sensor information AND Pump hardware protection Note1: Pump is forced to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2 : Pump in Heating OR Priming OR Run corresponds to $0 Pressure Control Not running OR $1=Pressure Control Refill Pipeline OR $2=Pressure Build Up OR $4=Pressure Closed Loop Control OR $5=Pressure Open Loop Control OR $7=Afterrun Wait Temperature Decrease OR $8=Afterrun Purge Pipeline	any of the three wake up signals is high (Pump Heating OR (Priming OR Run) > 2,5bar) = Not active P204B & P204C & P204D & P204E P204F & P208B & P20E8 & P20E9 & P149F & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Control Module Powertrain Sensor Bus Off	U2412	Reductant Control Module Powertrain Sensor Bus Off	Sensor bus CAN transmitter transmission errors Note: The BusOff state is provided by the CAN controller hardware per ISO 11898.	> 255	Sensor Bus Wakeup No DCU internal fault	Active P20FF & P10F4	90ms Failure out of 9 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	U2626	Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	Time whenever any CAN1 message has not been received by DEFC OR	> 35ms	Sensor Bus Wakeup No DCU internal fault	Active P20FF & P10F4	5s Failure out of 10 to 200 samples Diagnostic checks every received message (25ms, 100ms or 500ms). Depends on CAN message transmit time.	Type A, 1 Trip
			Time whenever any CAN2 message has not been received by DEFC OR	> 110ms				
			Time whenever any CAN3 message has not been received by DEFC OR	> 110ms				
			Time whenever any CAN4 message has not been received by DEFC	> 510ms				
Reductant Control Module Lost Communication with Reductant Level Sensor	U2627	SENT message shall respect received message diagnostic criteria from SAE J2716 (check with SENT Vector module)	Calibration pulse length AND Calibration pulse length AND Nibble value AND Nibble value AND Successive calibrations pulses differ by AND Cheksum error AND Not the expect number of falling edges between calibration pulses OR	> 42 clock ticks < 70 clock ticks < 15 > 0 +/- 1/64 TRUE TRUE	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,42 s Failure out of 14 samples Time basis = 30ms	Type A, 1 Trip
		Check if the nibble counter value is pertinent	Nibble2: Application Counter pattern	≠ {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1,26 s Failure out of 42 samples Time basis = 30ms	
Reductant Control Module Lost Communication with Reductant Concentration Sensor	U2628	SENT message shall respect received message diagnostic criteria from SAE J2716 (check with SENT Vector module)	Calibration pulse length AND Calibration pulse length AND Nibble value AND Nibble value AND Successive calibrations pulses differ by AND Cheksum error AND Not the expect number of falling edges between calibration pulses OR	> 42 clock ticks < 70 clock ticks < 15 > 0 +/- 1/64 TRUE TRUE	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,42 s Failure out of 14 samples Time basis = 30ms	Type A, 1 Trip
		Check if the nibble counter value is pertinent	Nibble2: Application Counter pattern	≠ {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1,26 s Failure out of 42 samples Time basis = 30ms	

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Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Control Module Lost Communication with Reductant Tank Temperature Sensor 2	U2630	SENT message shall respect received message diagnostic criteria from SAE J2716 (check with SENT Vector module)	Calibration pulse length AND Calibration pulse length AND Nibble value AND Nibble value AND Successive calibrations pulses differ by AND Cheksum error AND Not the expect number of falling edges between calibration pulses OR	> 42 clock ticks < 70 clock ticks < 15 > 0 < 1/64 +/-true true	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,42 s Failure out of 14 samples Time basis = 30ms	Type A, 1 Trip
		Check if the nibble counter value is pertinent	Nibble2: Application Counter pattern	≠ {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1,26 s Failure out of 42 samples Time basis = 30ms	

Issued: LP002

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Control Module Sensor Reference Voltage 1 Low Voltage	P1018	UTLC Sensor 5V supply is low	Quality sensor power supply	<= 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,2 s Failure out of 20 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 1 High Voltage	P1019	UTLC Sensor 5V supply is high	Quality sensor power supply	>= 5,25V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,2 s Failure out of 20 samples Time basis = 10ms	Type A, 1 Trip
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	Checks if the alive rolling counts in messages received from the ECM are pertinent	The alive counter of CAN1 shall pursue this pattern OR	≠ {0;1;2;3;0}	Sensor Bus Wakeup No DCU internal fault	= Active P20FF & P10F4	5 s Failure out of 10 to 200 samples Depends on CAN message transmit time. Diagnostic checks every received message (25ms, 100ms or 500ms). Depends on CAN message transmit time.	Type A, 1 Trip
			The alive counter of CAN2 shall pursue this pattern OR	≠ {0;1;2;3;0}				
			The alive counter of CAN3 shall pursue this pattern OR	≠ {0;1;2;3;0}				
			The alive counter of CAN4 shall pursue this pattern OR	≠ {0;1;2;3;0}				
		Checks if the transmitted message checksum equals the calculated checksum for messages received from the ECM	Checksum of the message of CAN1 OR	≠ computed cheksum				
			Checksum of the message of CAN2 OR	≠ computed cheksum				
			Checksum of the message of CAN3 OR	≠ computed cheksum				
			Checksum of the message of CAN4	≠ computed cheksum				
Reductant Control Module Sensor Reference Voltage 2 Low Voltage	P10C9	Reductant pressure sensor 5V supply is low	Pressure sensor power supply	<= 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 2 High Voltage	P10CA	Reductant pressure sensor 5V supply is high	Pressure sensor power supply	>= 5,25V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Heater 1 Control Circuit Shorted	P10D9	Detects if at least one heater high side and low side are shorted together	(Low side FET drain OR load current) AND **Error counter** Note: If a fault occurs with the heater on, the heater will be commanded off by the driver but cannot be pin-pointed. The driver cannot detect which heater is faulted. In Off state the circuit shorted ADC range is indistinguishable from normal state indicated below: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note2: **I**f the normal ADC state is indicated in the off state, then the heater is commanded on again. A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the **Error counter** threshold.	> 0,45V (MHE) > 95A (MHE) > 4 < 0,909V > 0,767V < 0,613V > 0,487V	Sensor Bus or Accessory or Ignition Run/Crank Heater power supply voltage No DCU internal fault At least one heater PWM command Note: Heaters power command is forced to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high >5,7V P20FF & P10F4 Different from zero P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1,2 s Failure out of 4 samples Success out of 12 samples Time basis = 100ms Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type B, 2 Trips
Reductant Control Module Ignition On/Start Switch Circuit High Voltage	P10DA	Run/crank wire input is high, when it is expected to be low	R/C wire state AND Serial data (GMLAN) R/C state	= HIGH = LOW	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	3 s Failure out of 300 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Ignition On/Start Switch Circuit Low Voltage	P10DB	Run/crank wire input is low, when it is expected to be high	R/C wire state AND Serial data (GMLAN) R/C state	= LOW = HIGH	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	Sensor Bus or Accessory or Ignition Run/Crank P20FF & P10F4	3 s Failure out of 300 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Heater Supply Circuit Low	P10DC	Tank heater supply voltage is lower than DEF system voltage	Raw permanent power supply voltage - Raw tank heater power supply	> 3,3V	Sensor Bus or Accessory or Ignition Run/Crank Propulstion System Active Application software has been running for a timer Engine cranking (serial data) After-run sequence No DCU internal fault	= Active = Active > 510ms = False = Not active P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type B, 2 Trips
Reductant Control Module Heater Supply Circuit High	P10DD	Tank heater supply voltage is greater than DEF system voltage	Raw tank heater power supply - Raw permanent power supply voltage	> 3,3V	Sensor Bus or Accessory or Ignition Run/Crank Propulstion System Active Application software has been running for a timer After-run sequence No DCU internal fault	= Active = Active > 510ms = Not active P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type B, 2 Trips

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 2 Control Circuit Shorted	P10F3	Detects if at least one heater high side and low side are shorted together	(Low side FET drain OR load current) AND **Error counter** Note: If a fault ocurrs with the heater on, the heater will be commanded off by the driver but cannot be pin-pointed. The driver cannot detect which heater is faulted. In Off state the circuit shorted ADC range is indistinguishable from normal state indicated below: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note2: If the normal ADC state is indicated in the off state, then the heater is commanded on again. A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the **Error counter** threshold.	> 0,45V (MHE) > 95A (MHE) > 4 < 0,909V > 0,767V < 0,613V > 0,487V	Sensor Bus or Accessory or Ignition Run/Crank Heater power supply voltage No DCU internal fault At least one heater PWM command: Note: Heater power command are forced to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high >5,7V P20FF & P10F4 Different from zero P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1,2 s Failure out of 4 samples Success out of 12 samples Time basis = 100ms Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type B, 2 Trips
Reductant Control Module Not Programmed	P10F4	Checks if service part has been reprogrammed with application specific sofware and calibration	**software operational reference calibration** AND MEC Note: **Software operational reference calibration** is set to true if application specific calibration has been flashed.	= FALSE = 0	Sensor Bus or Accessory or Ignition Run/Crank	any of the three wake up signals is high	No debounce applied Once at initialization	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 3 Low Voltage	P131B	Reductant temperature sensor 5V supply is low	Temperature sensor power supply	<= 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 3 High Voltage	P131C	Reductant temperature sensor 5V supply is high	Temperature sensor power supply	>= 5,25V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms	Type A, 1 Trip
Reductant Heater 3 Control Circuit Shorted	P143C	Detects if at least one heater high side and low side are shorted together	(Low side FET drain OR load current) AND **Error counter** Note: If a fault occurs with the heater on, the heater will be commanded off by the driver but cannot be pin-pointed. The driver cannot detect which heater is faulted. In the Off state the circuit shorted ADC range is indistinguishable from normal state indicated below: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note2: If the normal ADC state is indicated in the off state, then the heater is commanded on again. A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the **Error counter** threshold.	> 0,45V (MHE) > 95A (MHE) > 4 < 0,909V > 0,767V < 0,613V > 0,487V	Sensor Bus or Accessory or Ignition Run/Crank Heater power supply voltage No DCU internal fault At least one heater PWM command: Note: Heater power command are forced to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high >5,7V P20FF & P10F4 Different from zero P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1,2 s Failure out of 4 samples Success out of 12 samples Time basis = 100ms Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type B, 2 Trips
Reductant Pump Resistance Performance	P149F	Checks if the pump resistance is too low during the pump heating phase.	Pump driver power supply * duty cycle / driver current measure OR	< 0,23Ω	Sensor Bus or Accessory or Ignition Run/Crank Pump state AND Driver current measure Note: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Pump heating : $0 Pressure Control Not running > 0 P204B & P204C & P204D & P204E P204F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB P20FF & P10F4	8 s Failure out of 800 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
		Checks if the pump resistance is too high during the pump heating phase.	Pump driver power supply * duty cycle / driver current measure	> 0,8Ω				

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Level Sensor Circuit Range/Performance	P203B	Level measurements are not available when they should be available.	Level message **readiness** bit <u>Note</u>: The level **Readiness** is transmitted by the UTLC and is an indicator of level information availability.	= FALSE	Sensor Bus or Accessory or Ignition Run/Crank (**Refill / draining** has not been detected for a timer AND Estimated DEF Level AND **Slosh** AND Urea temperature AND Secondary temperature AND Tank heating AND **Tank agitation flag** AND Vehicle speed) No Level Sensor voltage fault No SENT communication fault No DCU internal fault See **"Level & Quality Performance"** sheet for parameters definition	any of the three wake up signals is high > 300s > 5L = False above slush threshold = 0°C above slush threshold = 3°C Tank is not heating = True > 2km/h P203C & P203D U2627 & U2628 & U2630 P20FF and P10F4	200s Failure out of 2000 samples Success out of 6 samples Time basis = 100ms	Type B, 2 Trips
Reductant Level Sensor Circuit Low Voltage	P203C	Measured level sensor signal is out of range low	[PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] <u>Note:</u> 1. All related signals are directly transmitted by UTLC. 2. PZT conditions are based on a single diagnosis status	> 5,5V < 4,5V > 2V < 0,125V	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type B, 2 Trips
Reductant Level Sensor Circuit High Voltage	P203D	Measured level sensor signal is out of range high	UTLC level measurement AND Level readiness bit	> 400 mm = TRUE	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	6 s Failure out of 12 samples Sucess out of 4 samples Time basis = 500ms	Type B, 2 Trips
Reductant Pressure Sensor Performance	P204B	Reductant pressure offset from ambient pressure is too low	Pressure value OR Time when debounce counter has not reached pass/fail limits	< -200 mbar >1s (timeout)	Sensor Bus or Accessory or Ignition Run/Crank Pump state No Pressure Sensor fault No DCU internal fault	any of the three wake up signals is high Pump start-up: $0 Pressure Control Not running P204C & P204D & P204E P20FF & P10F4	Up to 33 s (3X 1s timeout + 2*15s wait) Malfunction criteria confirmation out of 88 samples Time basis = 10ms Failure confirmation after **two retries** Recovery only at next driving cycle **Note**: See "**Repeat Defrost**" sheet for retries definition	Type A, 1 Trip
		Reductant pressure offset from ambient pressure is too high	Pressure value OR Time when debounce counter has not reached pass/fail limits	> 200 mbar > 1s (timeout)				
Reductant Pressure Sensor Circuit Low Voltage	P204C	Measured pressure sensor signal is out of range low	Pressure sensor signal voltage Note: Pressure sensor signal = -0,5bar when Pressure sensor signal voltage = 0,47V	< 0,45V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Pressure Sensor Circuit High Voltage	P204D	Measured pressure sensor signal is out of range high	Pressure sensor signal voltage Note: Pressure sensor signal = 9bar when Pressure sensor signal voltage = 4,7V	> 4,9V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Pressure Sensor Circuit Intermittent/Erratic	P204E	Reductant pressure signal is changing too quickly	ABS[Pressure sensor signal(t) - pressure sensor signal (t - sample time)] / sample time	> 100bar/s	Sensor Bus or Accessory or Ignition Run/Crank Application software has been running for a timer No Pressure Sensor fault No DCU internal fault	any of the three wake up signals is high >510ms P204C & P204D P20FF & P10F4	0,05 s Failure out of 5 samples Time basis = 10ms	Type A, 1 Trip
Reductant Tank Temperature Sensor Performance	P205B	Reductant temperature sensor offset from a startup reference temperature is too low after a sufficient off period	**Average engine startup reference temperature**- tank temperature sensor OR <u>Note</u>: **Average engine startup reference temperature** is transmitted by the ECM. It represents the average value of a minimum of 4 valid temperature following a minimum engine off period and other temperature stabilization criteria.	>= 30°C	Sensor Bus Wake up [**Average engine startup reference temperature mask** AND Time during which DEF-C application software is running AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor fault No CAN communication fault No DCU internal fault <u>Note</u>: **Average engine start-up reference temperature mask** is set to true if : Engine off time≥ 8hrs AND At least 4 sensors used in average engine startup reference temperature are valid)	= Active = "Use Data" > 1s < 3,5 s P205C & P205D & P205E U2412 & U2626 & P10C6 & P21CB P20FF and P10F4	0,3 s Failure out of 3 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
		Reductant temperature sensor offset from a startup reference temperature is too high after a sufficient off period	Tank temperature sensor -**Average engine startup reference temperature** <u>Note</u>: **Average engine startup reference temperature** is transmitted by the ECM. It represents the average value of a minimum of 4 valid temperature following a minimum engine off period and other temperature stabilization criteria.	>= 30°C				
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	Measured temperature sensor signal is out of range low	Temperature sensor signal voltage <u>Note</u>: Temperature sensor signal = 75°C when Temperature sensor signal voltage = 0,31V	< 0,3 V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Tank Temperature Sensor Circuit High Voltage	P205D	Measured temperature sensor signal is out of range high	Temperature sensor signal voltage <u>Note</u>: Temperature sensor signal = -40°C when Temperature sensor signal voltage = 4,7V	> 4,75V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Tank Temperature Sensor Circuit Erratic	P205E	Measured temperature sensor signal is intermittent	ABS[Tank temperature sensor signal(t) - tank temperature sensor signal (t - sample time)] / sample time	> 100°C/s	Sensor Bus or Accessory or Ignition Run/Crank No Tank Temperature Sensor fault No DCU internal fault	any of the three wake up signals is high P205C & P205D P20FF & P10F4	0,5 s Failure out of 5 samples Time basis = 100ms	Type A, 1 Trip
Reductant Quality Sensor Circuit Range/Performance	P206B	Quality measurements are not available when they should be available.	Quality message **readiness** bit <u>Note</u>: The quality **Readiness** is transmitted by the UTLC and is an indicator of level information availability.	FALSE	Sensor Bus or Accessory or Ignition Run/Crank (**Refill / draining** has not been detected for a timer AND Estimated DEF Level AND **Slosh** AND Urea temperature AND Secondary temperature AND Tank heating AND **Tank agitation flag** AND Vehicle speed No Level Sensor voltage fault No SENT communication fault No DCU internal fault See **"Level & Quality Performance"** sheet for parameters definition	any of the three wake up signals is high > 300s > 5L = False above slush threshold = 0°C above slush threshold = 3°C Tank is not heating = TRUE > 2km/h P203C & P203D U2627 & U2628 & U2630 P20FF & P10F4	60 s Failure out of 600 samples Success out of 40 samples Time basis = 100ms	Type A, 1 Trip
Reductant Quality Sensor Circuit Low	P206C	Measured quality sensor signal is out of range low	[(UTLC quality measurement AND Quality readiness bit) OR PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] <u>Note:</u> 1. All related signals are directly transmitted by UTLC. 2. PZT conditions are based on a single diagnosis status bit transmitted by the sensor	< 0% TRUE > 5,5V < 4,5V > 2V < 0,125V	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Quality Sensor Circuit High Voltage	P206D	Measured quality sensor signal is out of range high	UTLC quality measurement AND Quality readiness bit <u>Note</u>: Quality measurement >threshold is done inner DEF-C application software	> 63,5% TRUE	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Pump Control Circuit	P208A	Checks if one pump motor phase is not connected	Off-line: Driver device status register 7 value is On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. <u>Note</u>: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	[1 0 1 0 1 1] OR [1 1 1 0 1 1] OR [1 0 1 1 1 1]	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Pump Performance	P208B	Detects if there is a pump speed error	abs(Pump speed measured - pump speed set point)	> 712 rpm	Sensor Bus or Accessory or Ignition Run/Crank Pump state No DCU internal fault <u>Note1:</u> Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault <u>Note2</u>: Pump in Priming OR Run OR After-Run correspond to $1=Pressure Control Refill Pipeline OR $2=Pressure Build Up OR $4=Pressure Closed Loop Control OR $5=Pressure Open Loop Control OR $7=Afterrun Wait Temperature Decrease OR $8=Afterrun Purge Pipeline	any of the three wake up signals is high Pump in Priming OR Run OR After-Run P20FF & P10F4 P204B & P204C & P204D & P204E P204F & P149F & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	63 s (2X 15s fail to stabilize timeout + 2*15s wait time + 3s pump blocked confirmation) Malfunction criteria confirmation out of 300 samples Time basis = 10ms Failure confirmation after **two retries.** Between two retries, pump is stopped for 15s. When pressure hold is achieved, retries are no longer permitted and an effective retry is counted after 3s with the malfunction criteria met. Success is reported after maximum time that would be required to mature a fault has elapsed. Recovery is possible only on the next driving cycle <u>Note</u>: See "**Repeat Defrost**" sheet for retries definition	Type A, 1 Trip

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Pump Control Circuit Low Voltage	P208C	Checks if one pump motor phase is shorted to ground	Off-line: Driver device status register 7 value is On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump wi be commanded off, allowing to pin-point the specific failure mode	[0 1 0 1 0 1]	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Pump Control Circuit High Voltage	P208D	Checks if one pump motor phase is shorted to power.	Off-line: Driver device status register 7 value is On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump wi be commanded off, allowing to pin-point the specific failure mode	[1 0 1 0 1 0]	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,4 s Failure out of 40 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 1 Control Circuit	P20B9	Detects an open circuit on the tank heater control (+) or (-) circuit.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 1,083V > 0,926V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 1 Performance	P20BA	Detects if the tank heater resistance or power is outside operating thresholds.	Tank heater sides voltage difference / heater current OR Tank heater sides voltage difference / heater current OR Tank heater power command - Tank heater power OR Tank heater power - Tank heater power command	< 0,9Ω > 1,6Ω > 51W > 51W	Sensor Bus or Accessory or Ignition Run/Crank Tank heater PWM command No DCU internal fault Note: Tank heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 100ms Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 1 Control Circuit Low Voltage	P20BB	Detects if the tank heater control (+) or (-) circuit is shorted to ground.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 0,601V > 0,506V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 1 Control Circuit High Voltage	P20BC	Detects if the tank heater control (+) or (-) circuit is shorted to power	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 4,168V > 2,021V < 4,325V > 2,097V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Control Circuit	P20BD	Detects an open circuit on the line heater control (+) or (-) circuit.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 1,083V > 0,926V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip

20 OBDG04 Reductant Control Module Summary Tables

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 2 Performance	P20BE	Detects if the line heater resistance or power is outside operating thresholds.	Line heater sides voltage difference / heater current OR Line heater sides voltage difference / heater current OR Line heater power command - Line heater power OR Line heater power - Line heater power command	< 1,3Ω > 5,9Ω > 34W > 34W	Sensor Bus or Accessory or Ignition Run/Crank Line heater PWM command: No DCU internal fault Note: Line heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P221C & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 100ms Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Control Circuit Low Voltage	P20BF	Detects if the line heater control (+) or (-) circuit is shorted to ground.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 0,601V > 0,506V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Control Circuit High Voltage	P20C0	Detects if the line heater control (+) or (-) circuit is shorted to power	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 4,168V > 2,021V < 4,325V > 2,097V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF an&d P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 3 Control Circuit/Open	P20C1	Detects an open circuit on the tank heater 2 control (+) or (-) circuit.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 1,083V > 0,926V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 3 Control Circuit Performance	P20C2	Detects if the tankheater 2 resistance or power is outside operating thresholds.	Tank heater 2 sides voltage difference / heater current OR Tank heater 2 sides voltage difference / heater current OR Tank heater 2 power command - Tank heater 2 power OR Tank heater 2 power - Tank heater 2 power command	< 3Ω > 4,9Ω > 15W > 15W	Sensor Bus or Accessory or Ignition Run/Crank Tank heater 2 PWM command No DCU internal fault Note: Tank heater 2 power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 100ms Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 3 Control Circuit Low	P20C3	Detects if the tank heater 2 control (+) or (-) circuit is shorted to ground.	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 0,601V > 0,506V = 0V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 3 Control Circuit High	P20C4	Detects if the tank heater 2 control (+) or (-) circuit is shorted to power	On state: Low side FET drain OR load current Off state: (ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side) Note: If a fault is detected with the heater on, the heater will be commanded off, allowing the diagnostic to pinpoint the specific failure mode.	> 0,45V (MHE) > 95A (MHE) < 4,168V > 2,021V < 4,325V > 2,097V	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	1 s Failure out of 10 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Low Pressure	P20E8	Detects if reductant pressure is too low.	Pressure setpoint - pump pressure signal	>= 630mbar	Sensor Bus or Accessory or Ignition Run/Crank Pump state **Estimated DEF Level** No DCU internal fault Note1: Pump is forced to stop if: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault No DCU internal fault Note2: Pump in pressure hold corresponds to $4=Pressure Closed Loop Control Note3: When **estimated DEF level** is below the diagnostic enable (reporting threshold) noted above and the malfunction criteria is greater than 2bar continiously during 5s, then "Reductant Tank Empty" flag is set, impacting low reductant driver warning and inducement.	any of the three wake up signals is high Pump in Pressure hold > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P204F & P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	30 s Failure out of 3000 samples Success out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant High Pressure	P20E9	Detects if reductant pressure is too high.	Pump pressure signal - pressure setpoint	>= 630mbar	Sensor Bus or Accessory or Ignition Run/Crank Pump state Engine Auto Stop Active No DCU internal fault Note1: Pump is forced to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2: Pump in run corresponds to $1=Pressure Control Refill Pipeline, $2=Pressure Build Up, $4=Pressure Closed Loop Control and $5=Pressure Open Loop Control	any of the three wake up signals is high Pump in Run = False P20FF & P10F4 P204B & P204C & P204D & P204E P204F & P208B & P149F & P20E8 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Control Module Performance	P20FF	RAM pattern test fail	After writting a checker-board type pattern of 0's and 1's into the cells of a bit-oriented memory, difference is found between any cells' expected contents Note: this test is handle with RamTst Vector module, using checkerboard algorithm		Sensor Bus or Accessory or Ignition Run/Crank	any of the three wake up signals is high	No debounce applied Once at initialization	Type A, 1 Trip
		Dataset version does not fit the SW version	Computed checksum OR software operational reference calibration is incompatible to the application software	!= stored frame checksum				
		Persistent data error in Non-Volatile Memory	Aborded write operation is detected on applied Nvm blocks OR Calculated checksums of related Nvm blocks Note: Apply on Application data & IUMPR data Nvm blocks	!= stored checksums				
		Any data stored in Non-Volatile Memory is inconsistent	Aborded write operation is detected on applied blocks OR computed data checksum of related Nvm blocks OR Heater calibration are not learned during EOL Note: Apply on Heater calibration Nvm blocks	!= stored data checksum				
Reductant Pump High Current	P214E	Checks if the pump motor phase current exceeds the max operating limit current	If pump hardware protection OR (If Pump State = Heating Pump motor current Else Pump motor current)	= active > 15A > 7A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 1 sample in case pump hardware protection is detected. Else, failure out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip

20 OBDG04 Reductant Control Module Summary Tables

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 1 High Current	P214F	Detects if the tank heater driver output current is above the maximum limit current	Tank heater current	> 15A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Level Sensor 1 Stuck	P21C5	Reductant level sensor signa is unchanging in conditions where some change is expected	Level sensor signal(t) - Level sensor signal (t - 1000ms)	< 0,25 mm	Sensor Bus Wakeup or Accessory or Ignition Run/Crank **[[Vehicle speed** *(see note1)* AND **Vehicle speed validity** AND **Urea state]** AND Level readiness bit] *(see note2)* AND Estimated DEF Level No Level Sensor 1 faults No Tank Temperature Sensor A faults No CAN communication faults No SENT communication faults No DCU internal faults Note1: after minimum required vehicle speed is reached, related condition will be set at false when speed threshold is not reached on two continious samples. Note2: Conditions under bracket shall be continiously set for 600ms to enable the diagnostic. After being met, diagnostic i deactivated as soon as one condition is unmet. Note3: See "**Level & Quality Performance**" sheet for parameters definition	= Asserted ≥ 25km/h = True = liquid = True > 5L P203B & P203C & P203D & P131B & P131C P205B & P205C & P205D & P205E U2412 & U2626 & P10C6 & P21CB U2627 & U2628 & U2630 P20FF and P10F4	200s Failure out of 200 samples Sucess out of 1 sample Time basis = 1000ms	Type B, 2 Trips
Reductant Control Module Supply Voltage Low Voltage	P21CB	Measured permanent power supply voltage is low compared to the vehicle system voltage (received by serial data from ECM)	ECM (Serial Data) Voltage - permanent power supply voltage	> 3V	Sensor Bus Wake up Engine cranking (serial data) Engine Controller Sensed Powertrain Relay Voltage Mask No DCU internal fault	= Active = False = True P20FF & P10F4	3 s Failure out of 300 samples Time basis = 10ms	Type B, 2 Trips
Reductant Heater 1 Low Current	P21DD	Detects if the tank heater driver output current is below the minimum limit current	Tank heater current	< 0,75A	Sensor Bus or Accessory or Ignition Run/Crank Tank heater PWM command No DCU internal fault Note: Tank heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 Low Current	P221C	Detects if the line heater driver output current is below the minimum limit current	Line heater current	< 0,75A	Sensor Bus or Accessory or Ignition Run/Crank Line heater PWM command: No DCU internal fault Note: Line heater power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 2 High Current	P221D	Detects if the line heater driver output current exceeds the max operating limit current	Line heater current	> 15A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Heater 3 Current Too Low	P221E	Detects if the tank heater 2 driver output current is below the minimum limit current	Tank heater 2 current	< 0,75A	Sensor Bus or Accessory or Ignition Run/Crank Tank heater 2 PWM command No DCU internal fault Note: Tank heater 2 power command is force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault No DCU internal fault	any of the three wake up signals is high Different from zero P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P20DD &P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P20C2 & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Reductant Heater 3 Current Too High	P221F	The tank heater 2 driver output current exceeds the max operating limit current	Tank heater 2 current	> 15A	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	4 s Failure out of 40 samples Time basis = 100ms Recovery only at next driving cycle	Type B, 2 Trips
Excessive Time To Enter Closed Loop Reductant Injection Control	P249C	Detects if pressure build does not achieve desired target in time	**Pressure hold** AND [Total time from the start of line filling OR Total time from the exit of Start & Stop] Note: See "Repeat defrost" section for Pressure hold definition	!= active > 15s > 7,5s	Sensor Bus or Accessory or Ignition Run/Crank Pump state **Estimated DEF Level** No DCU internal fault Note1: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2: Pump in Priming OR Pressure build-Up corresponds to $1=Pressure Control Refill Pipeline OR $2=Pressure Build Up Note3: When **estimated DEF level** is below the diagnostic enable (reporting threshold) noted above and the failure is confirmed after 1 retry, then "Reductant Tank Empty" flag is set, impacting low reductant driver warning and inducement.	any of the three wake up signals is high Pump Priming OR Pressure built-Up > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P149F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P204F P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	75 s (3X 15s timeout + 2*15s wait) Malfunction criteria confirmation out of 1500 samples Time basis = 10ms Failure confirmation after**two retries.** Between two retries, pump is stopped for15s. Success is reported after maximum time that would be required to mature a fault has elapsed without the malfunction criteria being met. Recovery only at next driving cycle Note: See "**Repeat Defrost**" sheet for retries definition	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit Range/Performance	P2ADA	Measured UTLC temperature sensor is offset high	Secondary device temperature information - tank temperature sensor OR	>= 21°C	Sensor Bus Wake up [(**Average engine startup reference temperature mask** OR Service Tamper Bay test request) AND Time during which DEF-C application software is running AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor A fault No Tank Temperature Sensor B fault No SENT communication fault No DCU internal fault Note: **Average engine start-up reference temperature mask** is set to "Use Data" if : Engine Off Time Powertrain High Resolution AND At least 4 sensors used in average engine startup reference temperature are valid)	= Active = "Use Data" > 1s < 3,5 s P205B & P205C & P205D & P205E P2ADDP2ADB & P2ADC U2627 & U2628 & U2630 P20FF and P10F4 ≥ 8hrs	3 s Failure out of 6 samples Time basis = 500ms Recovery only at next driving cycle	Type A, 1 Trip
		Measured UTLC temperature sensor is offset low	Tank temperature sensor - secondary device temperature information	>= 21°C				
Reductant Tank Temperature Sensor B Circuit Low	P2ADB	Measured UTLC temperature sensor is out of range low	UTLC temperature measurement	< -50°C	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit High	P2ADC	Measured UTLC temperature sensor is out of range high	UTLC temperature measurement	> 90°C	Sensor Bus or Accessory or Ignition Run/Crank No SENT communication fault No DCU internal fault	any of the three wake up signals is high U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 500ms	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit Intermittent/Erratic	P2ADD	Measured temperature sensor signal gradient exceeds the expected value by intermittence	ABS[secondary device temperature sensor signal(t) - secondary device temperature sensor signal (t - 1.3s)]	> 8°C/1300ms	Sensor Bus or Accessory or Ignition Run/Crank No Tank Temperature Sensor B voltage fault No SENT communication fault No DCU internal fault	any of the three wake up signals is high P2ADB & P2ADC U2627 & U2628 & U2630 P20FF & P10F4	3,9 s Failure out of 3 samples Time basis = 1300ms	Type A, 1 Trip

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Pump Low Current	P2C11	Checks if the pump motor phase current is below the minimum operating current	If Pump State = Heating Pump motor current Else if (Pump State = Priming OR Run) Pump motor current	 < 0,75A < 0,5A	Sensor Bus or Accessory or Ignition Run/Crank Pump state AND Pressure sensor information AND Pump hardware protection Note1: Pump is forced to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault No DCU internal fault Note2 : Pump in Heating OR Priming OR Run corresponds to $0 Pressure Control Not running OR $1=Pressure Control Refill Pipeline OR $2=Pressure Build Up OR $4=Pressure Closed Loop Control OR $5=Pressure Open Loop Control OR $7=Afterrun Wait Temperature Decrease OR $8=Afterrun Purge Pipeline	any of the three wake up signals is high (Pump Heating OR (Priming OR Run) > 2,5bar) = Not active P204B & P204C & P204D & P204E P204F & P208B & P20E8 & P20E9 & P149F & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 10ms Recovery only at next driving cycle	Type A, 1 Trip
Reductant Control Module Powertrain Sensor Bus Off	U2412	Reductant Control Module Powertrain Sensor Bus Off	Sensor bus CAN transmitter transmission errors Note: The BusOff state is provided by the CAN controller hardware per ISO 11898.	> 255	Sensor Bus Wakeup No DCU internal fault	Active P20FF & P10F4	90ms Failure out of 9 samples Time basis = 10ms	Type A, 1 Trip
Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	U2626	Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	Time whenever any CAN1 message has not been received by DEFC OR Time whenever any CAN2 message has not been received by DEFC OR Time whenever any CAN3 message has not been received by DEFC OR Time whenever any CAN4 message has not been received by DEFC	> 35ms > 110ms > 110ms > 510ms	Sensor Bus Wakeup No DCU internal fault	Active P20FF & P10F4	5s Failure out of 10 to 200 samples Diagnostic checks every received message (25ms, 100ms or 500ms). Depends on CAN message transmit time.	Type A, 1 Trip
Reductant Control Module Lost Communication with Reductant Level Sensor	U2627	SENT message shall respect received message diagnostic criteria from SAE J2716 (check with SENT Vector module)	Calibration pulse length AND Calibration pulse length AND Nibble value AND Nibble value AND Successive calibrations pulses differ by AND Cheksum error AND Not the expect number of falling edges between calibration pulses OR	> 42 clock ticks < 70 clock ticks < 15 > 0 +/- 1/64 TRUE TRUE	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,42 s Failure out of 14 samples Time basis = 30ms	Type A, 1 Trip
		Check if the nibble counter value is pertinent	Nibble2: Application Counter pattern	≠ {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1,26 s Failure out of 42 samples Time basis = 30ms	
Reductant Control Module Lost Communication with Reductant Concentration Sensor	U2628	SENT message shall respect received message diagnostic criteria from SAE J2716 (check with SENT Vector module)	Calibration pulse length AND Calibration pulse length AND Nibble value AND Nibble value AND Successive calibrations pulses differ by AND Cheksum error AND Not the expect number of falling edges between calibration pulses OR	> 42 clock ticks < 70 clock ticks < 15 > 0 +/- 1/64 TRUE TRUE	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,42 s Failure out of 14 samples Time basis = 30ms	Type A, 1 Trip
		Check if the nibble counter value is pertinent	Nibble2: Application Counter pattern	≠ {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1,26 s Failure out of 42 samples Time basis = 30ms	

Component/System	Fault Code	Monitor Description	Malfunction Criteria	Threshold value	Secondary parameters	Enable conditions	Time Required	MIL Illuminating
Reductant Control Module Los Communication with Reductan Tank Temperature Sensor 2	U2630	SENT message shall respect received message diagnostic criteria from SAE J2716 (check with SENT Vector module)	Calibration pulse length AND Calibration pulse length AND Nibble value AND Nibble value AND Successive calibrations pulses differ by AND Cheksum error AND Not the expect number of falling edges between calibration pulses OR	> 42 clock ticks < 70 clock ticks < 15 > 0 < 1/64 +/-true true	Sensor Bus or Accessory or Ignition Run/Crank No DCU internal fault	any of the three wake up signals is high P20FF & P10F4	0,42 s Failure out of 14 samples Time basis = 30ms	Type A, 1 Trip
		Check if the nibble counter value is pertinent	Nibble2: Application Counter pattern	≠ {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1,26 s Failure out of 42 samples Time basis = 30ms	

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 Stuck Low Detected	B2B0D	This monitoring checks if the hardwired Run/Crank analog signal matches the value of the Run/Crank Terminal Status message received from the ECM. This fault is set if the two signals do not match where the hardwired signal is set to INACTIVE while the serial data signal is set to ACTIVE.	Run/Crank Analog Signal State **AND** Run/Crank Terminal Status **AND** X **OUT OF** Y	<= 1.5V = ACTIVE = 80 = 100	ECM Timed Out	= FALSE	0.8 [Sec]	Type B 2 Trips
Ignition Switch Run/Start Position Circuit Stuck High Detected	B2B0E	This monitoring checks if the hardwired Run/Crank analog signal matches the value of the Run/Crank Terminal Status message received from the ECM. This fault is set if the two signals do not match where the hardwired signal is set to ACTIVE while the serial data signal is set to INACTIVE.	Run/Crank Analog Signal State **AND** Run/Crank Terminal Status **AND** X **OUT OF** Y	>=5.5V = INACTIVE = 80 = 100	ECM Timed Out	= FALSE	0.8 [Sec]	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM System Voltage Low Detected	B2B11	This monitoring checks the two system battery voltage sensors and sets a fault if both are below 7.0V.	VBATT1 **AND** VBATT2 **AND** X **OUT OF** Y	< 7.0V < 7.0V = 1600 = 2000	BCM Timed Out **AND** System Power Mode	= FALSE != CRANK	1.6 [Sec]	Type C - No MIL
Bus-Off detected on the HS Primary bus (Bus A)	U2413	This fault is set if the HS Primary bus enters the Bus-Off state	Bus Off Event Occurred on HS Primary	= TRUE	Run/Crank Analog Signal State **OR** Comm Enable Hardwire Line **AND** System Voltage	>= 5.5V >= 4.5V > 5.5V	25[usec] for pass 10[usec] for fail	Type B 2 Trips
Internal memory failure on the CGM Detected	B2B12	This monitoring checks whether a double bit ECC error has occurred in code flash or RAM. This fault is set if an ECC error has occurred.	ECC Error Detected	= TRUE	Guarded Read Flag	= FALSE	50ms	Type B 2 Trips
		This monitoring checks and sets a fault if a defect in the data flash (NVM) is detected.	NVM Fault Detected	= TRUE	N/A	N/A	1.5 us	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Microcontroller Performance Failure Detected	B2B13	This monitoring shall check whether the ALU in the microcontroller is functioning correctly by running an algorithm and checking the results against an expected value. If the result is incorrect the fault shall be set.	Test Result 1 **AND** Test Result 2	!= Expected Result 1 != Expected Result 2	N/A	N/A	1.5 us	Type B 2 Trips
		This monitoring shall check whether any clock monitoring interrupts have occurred. If any clock monitoring interrupts have occurred this fault shall be set.	Clock Monitoring Interrupt Occurred	= TRUE	N/A	N/A		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communication with the ECM Detected	U18D5	This monitoring shall check a supervised message from the ECM to check the communication status. If the CGM has not received the supervised message from the ECM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 62.5[ms] **THEN** Secondary Timer (4 sec)	= TRUE = 0 sec	Run/Crank Analog Signal State **AND** System Voltage	>= 5.5V >= 7V	4.0625 [sec]	Type B 2 Trips
Loss of Communication with the TCM Detected	U18D7	This monitoring shall check a supervised message from the TCM to check the communication status. If the CGM has not received the supervised message from the TCM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 2.5[sec] **THEN** Secondary Timer (4 sec)	= TRUE = 0 sec	Run/Crank Analog Signal State **AND** System Voltage	= ACTIVE >= 7V	6.5 [sec]	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communication with the EBCM Detected	U18DC	This monitoring shall check a supervised message from the EBCM to check the communication status. If the CGM has not received the supervised message from the EBCM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 2.5[sec] **THEN** Secondary Timer (4 sec)	= TRUE = 0 sec	Run/Crank Analog Signal State **AND** System Voltage	= ACTIVE >= 7V	6.5 [sec]	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communication with the GPCM Detected	U18DE	This monitoring shall check a supervised message from the GPCM to check the communication status. If the CGM has not received the supervised message from the GPCM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 250[ms] **THEN** Secondary Timer (4 sec)	= TRUE = 0 sec	Run/Crank Analog Signal State **AND** System Voltage	= ACTIVE >= 7V	4.25 [sec]	Type B 2 Trips

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 > -20.00 [°C] AND < 55.00 [°C] > -3 [kPa/s] AND < 8 [kPa/s]	100 fail counters over 140 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed in range	> 2,600.00 [rpm] AND < 4,000.00 [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	> 70 [°C] ==TRUE < 130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND < 110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	AIC_BstSysDiagDenomDsbl ==FALSE		
					All enabling conditions last for a time	> **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 > -20.00 [°C] AND < 55.00 [°C] > -3 [kPa/s] AND < 8 [kPa/s]	240.00 fail counters over 300.00 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	> 1,100.00 [rpm] AND < 2,100.00 [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	> 70 [°C] ==TRUE < 130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND < 110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 HP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the HP EGR flow monitor is to detect HP EGR obstructions (insufficient HP EGR flow). The HP EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, HP EGR cooler (if present) outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBD limits. In particular environmental conditions where the provided HP EGR flow amount is not enough to have a robust monitoring, the HP EGR flow intrusive test can be enabled. When	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant x **P0401: Insufficient HP EGR flow barometric table B (sea level)** [mg]) + (MidBaro Constant x **P0401: Insufficient HP EGR flow barometric table B (mid level)** [mg]) + (LoBaro Constant x **P0401: Insufficient HP EGR flow barometric table B (low level)** [mg]) + (SeaBaro Constant x	Calibration on diagnostic enabling	**P0401, P131F: EGR flow monitor enabling** ==TRUE	400.00 fail counters over 500.00 sample counters sampling time is 25 ms	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Desired EGR rate	> 0 [%]		
					Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 13 [rpm], FALSE if > 16.00 [rpm]		
					for a minimum number of samples	> 20 [counts]		
					Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 0.20 [mm^3], FALSE if > 0.50 [mm^3]		
					for a minimum number of samples	> 25 [counts]		
					An air control transition	Refer to "Air Control		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the intrusive test is enabled, a dedicated flow setpoint value is provided to air control.		**P0401: Insufficient HP EGR flow barometric table A (sea level)** [mg] x **P0401: Insufficient HP EGR flow barometric correction (sea level)**) + (MidBaro Constant x **P0401: Insufficient HP EGR flow barometric table A (mid level)** [mg] x **P0401: Insufficient HP EGR flow barometric correction (mid level)**) + (LoBaro Constant x **P0401: Insufficient HP EGR flow barometric table A (low level)** [mg] x	has ended OR Such condition is disabled by calibration No active transition from a combustion mode to another one Throttle measured position Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Desired HP EGR flow Desired fuel quantity	Transition"Free Form OR 1.00 ==TRUE ==TRUE > 85.00 [%] > -20.00 [°C] > 69.60 [kPa] > 70.00 [°C] ==TRUE > **P0401: Minimum desired HP EGR flow** [mg] > **P0401: Insufficient HP EGR flow Min fuel enabling condition** [mm^3] AND <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P0401: Insufficient HP EGR flow barometric correction (low level))	Outside air temperature in range Desired LP EGR split LP EGR valve measured position No faults on proper temperature sensor All enabling conditions last for a time	**P0401: Insufficient HP EGR flow Max fuel enabling condition** [mm^3] Condition must be TRUE. Refer to "P0401, P131F, P049B: Outside air temperature" Free Form == 0% < 1.00 [%] AIC_EGR_FlowDiagAirTempFA ==FALSE >= 0.70 [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 HP EGR flow barometric table B (sea level)** [mg]) + (MidBaro Constant	Calibration on diagnostic enabling Difficult launch NOT detected Engine Running Cranking ignition in range	**P0401, P131F: EGR intrusive test enabling** ==TRUE Refer to "LDT_DifficultLaunchActive" Free Form ==TRUE Battery voltage > 11.00 [V]	400.00 fail counters over 500.00 sample counters sampling time is 25 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				x **P0401: Insufficient HP EGR flow barometric table B (mid level)**	PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
				[mg]) +	Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
				(LoBaro Constant	Desired EGR rate	> 0 [%]		
				x **P0401: Insufficient HP EGR flow barometric table B (low level)**	Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 13 [rpm], FALSE if > 16.00 [rpm]		
				[mg]) +	for a minimum number of samples	> 20 [counts]		
				(SeaBaro Constant x	Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 0.20 [mm^3], FALSE if > 0.50 [mm^3]		
				P0401: Insufficient HP EGR flow barometric table A (sea level) [mg]	for a minimum number of samples	> 25 [counts]		
				x **P0401: Insufficient HP EGR flow barometric correction (sea level)**)	An air control transition has ended OR Such condition is disabled by calibration	Refer to "Air Control Transition"Free Form OR 1.00 ==TRUE		
				+ (MidBaro Constant x	No active transition from a combustion mode to another one	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P0401: Insufficient HP EGR flow barometric table A (mid level)	Throttle measured position	> 85.00 [%]		
				[mg] x	Outside Air Temperature	> -20.00 [°C]		
				P0401: Insufficient HP EGR flow barometric correction (mid level)	Ambient Pressure	> 69.60 [kPa]		
				) + (LoBaro Constant x	Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 70.00 [°C] ==TRUE		
				P0401: Insufficient HP EGR flow barometric table A (low level) [mg] x	Outside air temperature in range	Condition must be FALSE. Refer to "P0401, P131F, P049B: Outside air temperature" Free Form		
				P0401: Insufficient HP EGR flow barometric correction (low level))	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 ==FALSE		
					Time since last HP EGR flow insufficient monitoring (standard test or intrusive test) test completion	> 0.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Desired fuel quantity	> **P0401: Insufficient HP EGR intrusive test Min fuel enabling condition** [mm^3] AND < **P0401: Insufficient HP EGR intrusive test Max fuel enabling condition** [mm^3]		
					All enabling conditions above last for a time	> 0.00 [s]		
					Desired LP EGR split	== 0%		
					LP EGR valve measured position	< 1.00 [%]		
					All enabling conditions (included the above timer) last for a time	>= 0.70 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 = 0.00 [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 = 1.00 [Boolean] AND DPF_RegenMonitorSelected = NOT(0.00 [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 = 0.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [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 = 0.00 [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 < 72.00 [KPa] OR Amb Temp < 252.00 [K] OR Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean]; **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 = 0.00 [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 > 74.36 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 0.00 [°C] AND Cat Up Temp Snsr < 783.15 [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 > 74.36 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat Up Temp Snsr > 593.00 [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 < 1,000.00 [g/s] AND 0.00 < Cat Up Temp Snsr [K] < 1,000.00 AND 0.00 < Post Inj Fuel Qnty [g/s] < 1,000.00 AND Post Inj Fuel Qnty [g/s] < -1,000.00 for less than 0.00 [s] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean]; **Oxidation heat release integrator and post injected fuel integrator are both frozen if:** - Engine not running OR Cat Up Exh Flow [g/s] < 0.00 OR Cat Up Exh Flow > 1,000.00 [g/s] OR Cat Up Temp Snsr [K] < 0.00 OR Cat Up Temp Snsr [K] > 1,000.00 OR Post Inj Fuel Qnty [g/s] <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					out of range	0.00 OR Post Inj Fuel Qnty [g/s] > 1,000.00		
					OR - Consecutive time in which Post Injection Fuel rate is lower than a threshold is more than a calibration	OR Post Inj Fuel Qnty [g/s] < -1,000.00 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 regeneration enabled	**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 not in fault (Fault Flag = FALSE)	AND Injection System Flt = NOT (FUL_GenericInjSysFlt)		
					AND - Ambient temperature information not in fault	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 > 74.36 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean];		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P049B: Insufficient LP EGR flow barometric correction (low level))		[mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P131F, P049B: Outside air temperature" Free Form		
					Desired LP EGR split	== 100%		
					HP EGR valve measured position	< 2.00 [%]		
					No faults on proper temperature sensor	AIC_LPE_FlowDiagAirTempFA ==FALSE		
					All enabling conditions last for a time	>= 1.10 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HP EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140B: Increasing HP EGR slow response threshold** [%]	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one (Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	**P140B, P140C: HP EGR slow response enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0.05 [s] > 0 [%] ==TRUE > 70.00 [°C] ==TRUE < 129.00 [°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.
					Throttle measured position	> 85.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 100.00 [mg]		
					Desired fuel quantity in range	> **P140B: Increasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140B: Increasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 350.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold	< 1.50 [mg/s]		
					Desired HP EGR flow gradient (Req-ReqOld)	TRUE if > 1.30 [mg],		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					greater than a threshold, with hysteresis	FALSE if < 0.80 [mg]		
					Hysteresis lasts for a limited number of samples	<= 45.00 [count]		
					HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis	TRUE if > 40.00 [mg], FALSE if < 15.00 [mg]		
					Desired HP EGR rate	> 7.00 [%]		
					HP EGR valve position OR it is above that threshold for a time	<= 55.00 [%] >= 0.02 [s]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal HP EGR valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVld ==FALSE		
					All enabling conditions last for a time	>= 0.05 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HP EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140C: Decreasing HP EGR slow response threshold** [%]	Calibration on diagnostic enabling	**P140B, P140C: HP EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>= 200.00 sampling time is 25ms	
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 0.05 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 70.00 [°C] ==TRUE < 129.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Throttle measured position	> 85.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 100.00 [mg]		
					Desired fuel quantity in range	> **P140C: Decreasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140C: Decreasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 350.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) greater than a threshold	> -1.45 [mg/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold, with hysteresis Hysteresis lasts for a limited number of samples HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis Desired HP EGR rate Exhaust manifold pressure is valid Nominal HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	TRUE if < -1.30 [mg], FALSE if > -0.70 [mg] <= 45.00 [count] TRUE if < -35.00 [mg], FALSE if > -15.00 [mg] < 55.00 [%] EXM_ExhMnfdPresNotVld ==FALSE EGR_VlvTotFlowNomNotVld ==FALSE LPE_VlvTotFlowNomNotVld ==FALSE > 0.02 [s]		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust Throttle measured position	> 60.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					HP EGR valve total mass error (absolute value, | desired HP EGR mass - estimated HP EGR mass|)	< 200.00 [mg]		
					Desired fuel quantity in range	> **P14A5: Increasing LP EGR slow response Min fuel enabling condition** [mm^3] AND < **P14A5: Increasing LP EGR slow response Max fuel enabling condition** [mm^3]		
					LP EGR differential pressure in range	> 0.60 [kPa] AND < 2.40 [kPa]		
					Desired LP EGR flow gradient (Req-ReqOld) lower than a threshold	< 4.40 [mg/s]		
					Desired LP EGR flow gradient (Req-ReqOld)	TRUE if		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					greater than a threshold, with hysteresis Hysteresis lasts for a limited number of samples LP EGR valve total mass error (desired LP EGR mass - estimated LP EGR mass) in range, with hysteresis Desired LP EGR rate LP EGR valve position OR it is above that threshold for a time No fault on Exhaust throttle valve position sensor HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	> 3.40 [mg], FALSE if < 0.00 [mg] <= 14.00 [count] TRUE if > 55.00 [mg], FALSE if < 18.00 [mg] > 4.00 [%] <= 15.00 [%] >= 0.02 [s] LEV_PstnSnsrFA ==FALSE EGR_VlvTotFlowNotValid ==FALSE LPE_VlvTotFlowNomNotVld ==FALSE >= 0.02 [s]		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust Throttle measured position	> 60.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					HP EGR valve total mass error (absolute value, | desired HP EGR mass - estimated HP EGR mass|)	< 200.00 [mg]		
					Desired fuel quantity in range	> **P14A6: Decreasing LP EGR slow response Min fuel enabling condition** [mm^3] AND < **P14A6: Decreasing LP EGR slow response Max fuel enabling condition** [mm^3]		
					LP EGR differential pressure in range	> 0.80 [kPa] AND < 2.40 [kPa]		
					Desired LP EGR flow gradient (Req-ReqOld) greater than a threshold	> -6.00 [mg/s]		
					Desired LP EGR flow gradient (Req-ReqOld)	TRUE if		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					lower than a threshold, with hysteresis Hysteresis lasts for a limited number of samples LP EGR valve total mass error (desired LP EGR mass - estimated LP EGR mass) in range, with hysteresis Desired LP EGR rate No fault on Exhaust throttle valve position sensor HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	< -2.50 [mg], FALSE if > 0.00 [mg] <= 8.00 [count] TRUE if < -50.00 [mg], FALSE if > -15.00 [mg] < 8.00 [%] LEV_PstnSnsrFA ==FALSE EGR_VlvTotFlowNotValid ==FALSE LPE_VlvTotFlowNomNotVld ==FALSE >= 0.02 [s]		

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 Catalyst 1 - EWMA Enabled	P20EE	The diagnosis checks if there is a malfunction in the SCR1 (SCRF) NOx conversion system measuring its NOx conversion efficiency. SCR1 NOx conversion efficiency is evaluated by two NOx sensors (upstream & downstream SCR1, also defined as NOx#1 and NOx#2 respectively). Considering that NOx sensors are cross-sensitive (they measure both NOx and NH3), NOx#2 will be affected by NH3 at SCR1 outlet. The monitoring is executed by comparing SCR1 measured NOx conversion efficiency and SCR1 reference efficiency: - Measured NOx conversion efficiency is calculated as η_Eff_SCR1_Msrd = 1 - [∫ NOx_SCR1_Dwn_Msrd / ∫ NOx_SCR1_Up_Msrd]	EWMA filtering is applied to the difference between measured SCR1 NOx conversion efficiency (η_Eff_SCR1_Msrd) and reference one (η_Eff_SCR1_Ref)	Fail threshold is = 0, Repass threshold is = 0	Test enabled by calibration; No active DTCs; Debounce time elapsed after SCR1 chemical model is healed; Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is in Rapid Response (RR) or Fast Initial Response (FIR) state; Tests per trip up to calibratable value when EWMA filter is in Fast Initial Response (FIR) state; Total tests executed in Fast Initial Response (FIR) state up to calibratable value; Tests per trip up to	CalOut = 1 [Boolean]; ≠ NOX_Snsr1_NOx_Flt ≠ NOX_NOx_SnsrSCR_DwnFlt ≠ EGT_TempSCR_UpFlt ≠ EGP_PresSCR_UpFlt ≠ EXF_TotExhSCR_UpFlt ≠ SCR_RDP_Flt ≠ SCR_TipStuckFltSt ≠ SCR_ChemicalMdlFlt; Debounce = 100 [s]; NotDsbl = True [Boolean]; NotRun = True [Boolean]; FIR test trip < 1 ; FIR tot tests < 2 ; RR test trip < 1 ;	One failure to set the DTC.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		- Reference efficiency is evaluated as η_Eff_SCR1_Ref = 1 - [∫ NOx_SCR1_Dwn_Ref / ∫ NOx_Up_SCR1_Msrd] NOx_SCR1_Dwn_Ref is calculated as NOx_SCR1_Dwn_Ref = NOx_SCR1_Up_Msrd * (1 - (SCR1_eff_estimated - offset)) SCR1_eff_estimated comes from SCR1 chemical model and it takes into account the estimated amount of NOx and NH3 at SCR1 outlet: SCR1_eff_estimated = 1 - (NOx_SCR1_Dwn_est +NH3_SCR1_Dwn_est) / NOx_SCR1_Up_Msrd			calibratable value when EWMA filter is in Rapid Response (RR) state; Total tests executed in Rapid Response (RR) state up to calibratable value; DEF system ready to inject; Urea inside the tank not frozen; Debounce time elapsed after DEF defrost has been completed; Engine torque request higher than calibration; Rate of change of estimated efficiency (from SCR1 catalyst model) less than or equal to a calibratable value; Debounce time elapsed after condition based on rate of change of estimated efficiency is met; Upstream SCR1 NOx sensor measurement reliable; Downstream SCR1 NOx sensor measurement reliable;	 RR tot tests < 4 ; DEF ready = True [Boolean]; DEF tank status = DEF_TankNotFrozen [Enumerative]; Debounce = 0 [s]; Torque >= 50 [Nm]; |Rate of change of estimated efficiency| <= 1 [-] Debounce = 2 [s]; Reliable = True [Boolean]; Reliable = True [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		This allows being aligned to cross-sensitive NOx sensor #2. The offset (**K_EffOffset**) is calibrated in order to detect a malfunction. Test is performed when NOx integral upstream SCR1 reaches 1,200.00 [mg]. Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR1 catalyst de-greened); SCR1 service bay test not active; Debounce time elapsed after exiting from SCR1 service bay test; Outside ambient temperature higher than calibration with hysteresis; Ambient pressure higher than calibration with hysteresis; Urea dosing activation by SCR1 mean temperature condition; Debounce time elapsed after urea dosing activation by SCR1 mean temperature becomes true; Difference between SCR1 upstream and SCR1 downstream temperatures: - higher than first calibration curve (f[SCR1 mean	DPF Rgn Compt > 0 [-]; Service Bay Test == ServNotRunning [Enumerative]; Debounce = 0 [s]; OAT > -9 [°C]; -9 [°C] < hysteresis range < -9 [°C] Pressure > 72 [kPa]; 70 [°C] < hysteresis range < 72 [°C] SCR1 mean temperature > 185 [°C]; 180 [°C] < hysteresis range < 185 [°C] Debounce = 100 [s]; SCR1 up/down diff temperature > **T_MinTempGrad** [°C] Temperature < **T_MaxTempGrad** [°C];		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(f[SCR1 mean temperature time derivative]) and records the maximum value; - instead when SCR1 mean temperature time derivative gets within the limits, countdown starts until debounce time has been reached;			
					Upstream SCR1 NOx flow measurement lower than calibration and debounce time elapsed based on following logic: - while SCR1 NOx flow measurement higher than calibration, the system continuously evaluates the NOx average flow; - instead when SCR1 NOx flow measurement gets lower than calibration, debounce time based on calibration curve (f[NOx average flow, time spent with NOx flow higher than calibration]) is evaluated and countdown starts until debounce time has been elapsed. Limitation on the debouce time is always applied;	NOx1 up flow < 75 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max debounce = 30 [s];		
					Upstream SCR1 NOx flow measurement higher than calibration;	NOx up flow > 2 [mg/s];		
					Upstream SCR1 NOx sensor measurement	NOx up > 125 [ppm];		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					condition is met;			
					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 = 60 [s];		
					NH3 storage deviation error of SCR1 (difference between storage estimation and storage set-point): - higher than first calibration curve (f[SCR1 average temperature]) AND - lower than second calibration curve (f[SCR1 average temperature]);	NH3 deviation > **m_NH3_StrgDevErrMinThrsh** [g] NH3 deviation < **m_NH3_StrgDevErrMaxThrsh** [g];		
					NH3 storage of SCR1: - higher than first calibration curve (f[SCR1 average temperature]) AND - lower than second calibration curve (f[SCR1 average temperature]);	NH3 storage > **m_NH3_StrgMinThrsh** [g] NH3 storage < **m_NH3_StrgMaxThrsh** [g];		
					Debounce time elapsed after condition based on NH3 storage deviation error and NH3 estimated storage is met;	Debounce = 5 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR dosing in NH3 storage control or in intrusive NH3 storage control; Debounce time elapsed after switching to NH3 storage control or intrusive NH3 storage control; Diesel Exhaust Fluid quality measurement (concentration read by DEF quality sensor) higher than calibration with hysteresis (condition active only if DEF quality sensor is available);	Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 10 [s]; DEF concentration > 29 [Pct]; 27 [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.
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	> 16 to 16 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 (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 4.0 mm^3/stroke = 0.00 = FALSE) = 0.00 ≥ 0 kPa) = 0.00 ≥ -40 °C) P000F	320 failures out of 640 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint -		Run crank voltage	≥ 11.0 V	320 failures out	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			measured rail pressure	> 16 to 16 MPa (see table **P229A Positive rail pressure deviation (PR)**)	Engine running Pressure Regulator controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	> 2.0 mm^3/stroke = 0.00 = FALSE) = 0.00 ≥ 0 kPa) = 0.00 ≥ -40 °C)	of 640 samples 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 1 Exceeded Control Limits - Pressure Too High	P228D	Determine when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< -18 to -18 MPa (see table **P228D Negative rail pressure deviation (MU)**	Run crank voltage Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	≥ 11.0 V > 4.0 mm^3/stroke > -40 °C == 0.00 = FALSE) = 0.00 ≥ 0 kPa) = 0.00 ≥ -40 °C)	320 failures out of 640 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	< -18 MPa	Run crank voltage Pressure Regulator controlled in closed loop (refer to RailPresCntrl)	≥ 11.0 V	320 failures out of 640 samples 12.5 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	> 4.0 mm^3/stroke = 0.00 = FALSE) = 0.00 ≥ 0 kPa) = 0.00 ≥ -40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Delivery Performance (EWMA filtered)	P2BAA	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery.	EWMA of Pressure Drop Deviation Pressure Drop Variation is evaluated as: Average of DEF line pressure when no dosing - Average of DEF line pressure when performing test injections - **P2BAA RDP Min Press Drop** EWMA filter coefficients: Standard Fast Initial Response Rapid Response	> 0 kPa 0.08 0.38 0.20	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 > 200.00 °C < 500.00 °C < 3.00 °C = 100ms * 100.00 > 18,992.00 mg < 10,000,000,000.00 mg >= 0.00 mg > 8.00 g/s == FALSE < 200.00 mg/s >= 100ms * 0.00 = NOT FROZEN	Function Task: 25ms	Type A, 1 Trips , EWMA

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	[OAT_PtEstFiltFA or OAT_OAT_SnsrNonEmiss FA]		
					No fault for Upstream SCR Exhaust Flow	EXF_TotExhSCR_UpFlt		
					No fault for Barometric Pressure	AAP_AmbientAirPresDfltd		
					No fault for Upstream NOx Sensor Concentration	== FALSE		
					No fault for Vehicle Speed Sensor	VehicleSpeedSensor_FA		
					Vehicle Speed below calibratable threshold for calibratable time	<= 3.00 km/h >= 100ms * 10.00		
					No DEF Metering Valve Tip Stuck Fault	SCR_TipStuckFltSt		
					Engine Mode	== RUNNING		
					(Fuel injection quantity request OR Idle speed control active)	< 30.0 mm^3		
					(Engine speed OR Idle speed control active)	600 < rpm < 2,500		
					(DEF pressure deviation (actual - desired) when no			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					dosing OR amount of no dosing phase cycles)	<= 50.00 kPa >= 2		

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 Catalyst 2 - EWMA Enabled	P2C7A	The diagnosis checks if there is a malfunction in the Underfloor SCR (UF SCR, or SCR2) catalyst by measuring its capability to store NH3 and to convert NOx. The monitor is based on two NOx sensors (upstream & downstream SCR2, also defined as NOx#2 and NOx#3 respectively) that measure both NH3 and NOx. The diagnostic parameter is SCR2 efficiency (it is indeed an "efficiency" index since it considers both NH3 storage capability and NOx conversion). Measured efficiency is compared to reference one (based on calibratable offset): - Measured efficiency is calculated as η_Eff_SCR2_Msrd = 1 - [∫ NOx_SCR2_Dwn_Msrd / ∫ NOx_SCR1_Up_Msrd]	EWMA filtering is applied to the difference between measured SCR2 efficiency (η_Eff_SCR2_Msrd) and reference one (η_Eff_SCR2_Ref)	Fail threshold is = 0, Repass threshold is = 0	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC.	Type A, 1 Trips
					No active DTCs;	≠ NOX_Snsr2_NOx_Flt ≠ NOX_Snsr3_NOx_Flt ≠ EGT_TempSCR2_UpFlt ≠ EGP_PresSCR2_UpFlt ≠ EXF_TotExhSCR2_UpFlt ≠ SCR_RDP_Flt ≠ SCR_TipStuckFltSt ≠ SCR_DEFMV_FA ≠ SCR_ChemicalMdlFlt_SCR2 ;		
					Diagnostic system not disabled;	NotDsbl = True [Boolean];		
					Test not yet executed on current key cycle except the case where EWMA filtering is in Rapid Response (RR) or Fast Initial Response (FIR) state;	NotRun = True [Boolean];		
					Tests per trip up to calibratable value when EWMA filter is in Fast Initial Response (FIR) state;	FIR test trip < 1 ;		
					Total tests executed in Fast Initial Response (FIR) state up to calibratable value;	FIR tot tests < 2 ;		
					Tests per trip up to calibratable value when	RR test trip < 1 ;		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		- Reference efficiency is evaluated as $\eta\_Eff\_SCR2\_Ref = 1 - [\int NOx\_SCR2\_Dwn\_Ref / \int NOx\_SCR1\_Up\_Msrd]$			EWMA filter is in Rapid Response (RR) state;			
					Total tests executed in Rapid Response (RR) state up to calibratable value;	RR tot tests < 4 ;		
					DEF system ready to inject;	DEF ready = True [Boolean];		
		NOx_SCR2_Dwn_Ref is calculated as NOx_SCR2_Dwn_Ref = NOx_SCR2_Up_Msrd * offset			Urea inside the tank not frozen;	DEF tank status = DEF_TankNotFrozen [Enumerative];		
					Debounce time elapsed after DEF defrost has been completed;	Debounce = 0 [s];		
		The offset (**K_EffOffset_SCR2**) is calibrated in order to detect a malfunction.			Upstream SCR2 NOx sensor measurement reliable;	Reliable = True [Boolean];		
		Test is performed when NOx+NH3 integral upstream SCR2 reaches 400.00 [mg].			Downstream SCR2 NOx sensor measurement reliable;	Reliable = True [Boolean];		
		Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			Slip detection SCR2 reliable;	Slip detection SCR2 reliable = True [Boolean];		
					Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR2 catalyst de-greened);	DPF Rgn Compt > 0 [-];		
					SCR service bay test not active;	Service Bay Test == ServNotRunning [Enumerative];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Debounce time elapsed after exiting from SCR service bay test; Outside ambient temperature higher than calibration with hysteresis; Ambient pressure higher than calibration with hysteresis; SCR1 average temperature in range; Debounce time elapsed after SCR1 average temperature is in range; Difference between SCR2 upstream and SCR2 downstream temperatures: - higher than first calibration curve (f[SCR2 mean temperature]) AND - lower than second calibration curve (f[SCR2 mean temperature]); Debounce time elapsed after condition based on difference between SCR2 upstream and downstream temperature is met; Exhaust mass flow	Debounce = 0 [s]; OAT > -9 [°C]; -9 [°C] < hysteresis range < -9 [°C] Pressure > 72 [kPa]; 70 [°C] < hysteresis range < 72 [°C] 220.00 [°C] < SCR1 mean temperature < 400 [°C]; Debounce = 5 [s]; SCR2 up/down diff temperature > **T_MinTempGrad_SCR2** [°C] SCR2 up/down diff temperature < **T_MaxTempGrad_SCR2** [°C]; Debounce = 10 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					upstream SCR2 and SCR2 average temperature within calibratable limits defined by 2 size table (f[exhaust mass flow, SCR2 average temperature]), enabled if table output is greater than calibration; Debounce time elapsed after condition based on exhaust mass flow upstream SCR2 and SCR2 average temperature is met; SCR2 mean temperature time derivative within limits defined by maximum and minimum calibrations and debounce time elapsed based on following logic: - while SCR2 mean temperature time derivative is outside the limits, the system continuously evaluates the debounce time based on calibration curve (f[SCR2 mean temperature time derivative]) and records the maximum value; - instead when SCR2 mean temperature time derivative gets within the limits, countdown starts until debounce time has been reached;	**K_EffExhFlowCond_SCR2** > 1 [-]; Debounce = 5 [s]; -2 < Delta temperature < 2 [°C/s]; Debounce = **t_DerTempDsblTmr_SCR2** [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Upstream SCR2 NOx flow measurement lower than calibration;	SCR2 NOx up flow < 25 [mg/s];		
					Upstream SCR2 NOx flow measurement higher than calibration;	SCR2 NOx up flow > 0 [mg/s];		
					Upstream SCR2 NOx sensor measurement higher than calibration;	SCR2 NOx up > 35 [ppm];		
					Upstream SCR2 NOx sensor measurement lower than calibration;	SCR2 NOx up < 500 [ppm];		
					Upstream SCR2 absolute NOx flow derivative lower than calibration;	Delta SCR2 NOx up flow < 15 [mg/s^2];		
					Debounce time elapsed when all NOx conditions become true;	Debounce = 1 [s];		
					Slip conditions: - debounce time elapsed when no slip downstream SCR2 is detected any more, OR - when slip is active, NOx flow upstream SCR2 accumulated shall be greater than a calibration curve (f[SCR2 average temperature]);	Debounce = 30.00 [s] ∫ NOx_SCR2Up > **m_SlipNOxIntglThrsh_SCR2** [mg];		
					Specific combustion modes not active;	Cmb ≠ KaSCRR_b_MontrCombMode_SCR2 [Enumerative];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Debounce time elapsed after exiting from specific combustion modes; SCR2 NH3 storage deviation error (difference between estimated storage and set-point): - higher than first calibration curve (f[SCR2 average temperature]) AND - lower than second calibration curve (f[SCR2 average temperature]); SCR2 NH3 storage: - higher than first calibration curve (f[SCR2 average temperature]) AND - lower than second calibration curve (f[SCR2 average temperature, exhaust mass flow upstream SCR2]) considering also SCR2 catalyst aging (one curve for degreened component and another curve for aged component, with interpolation for medium aging levels); Debounce time elapsed after conditions based on SCR2 NH3 storage deviation error and SCR2 NH3 storage level are met; SCR dosing in NH3	Debounce = 60 [s]; SCR2 NH3 deviation > **m_NH3_StrgDevErrMin_SCR2** [g] SCR2 NH3 deviation < **m_NH3_StrgDevErrMax_SCR2** [g]; SCR2 NH3 storage > **m_NH3_StrgMin_SCR2** [g]; SCR2 NH3 storage (if catalyst is degreened) < **m_NH3_StrgMax_SCR2** [g]; SCR2 NH3 storage (if catalyst is aged) < **m_NH3_StrgMaxAge_SCR2** [g]; interpolation for medium aging levels; Debounce = 5 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					storage control or in intrusive NH3 storage control; Debounce time elapsed afetr switching to NH3 storage control or intrusive NH3 storage control;	Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 10 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] > 120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 70.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 [%] < -85.00 [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 >= 70.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
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_EC M_PresAmbWghtLo**)	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.00 + 1.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean]) > 1.00 [s] > 70.00 [kPa] 0 [boolean] = TRUE > 45.00 [°C] > -20.00 [°C] different from Neutral or Parking	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time (only in case of Automatic Transmission)	> 0.50 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 50 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 2.00 [s]		
					m. Vehicle speed in operating range for a time	> 30 [kph] < 140 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_** (**CombModeGrp**)		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.00 + 1.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean]) > 1.00 [s] > 70.00 [kPa] 0 [boolean] = TRUE > 45.00 [°C] > -20.00 [°C] different from Neutral or	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	Parking > 0.50 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 50 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 2.00 [s]		
					m. Vehicle speed in operating range for a time	> 30 [kph] < 140 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_** (**CombModeGrp**)		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	This diagnosis verifies the plausibility of Engine Out NOx Sensor signal	Check if (Engine Out NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -51 % OR > 70.00 %	Engine is running 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_FltSt ==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: - 0.75 if FIR is active - 0.25 if RR is active - 0.16 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 No failure on injectors No failure on high pressure fuel rail system No failure on intake manifold absolute pressure Sensor Modeled Engine Out NOx concentration Steady state detection: a) Modeled Engine Out NOx concentration step at 100 ms. b) condition a) is fulfilled for time Ambient air pressure Outside air temperature Combustion mode dependent enabling flag Intake manifold absolute pressure Injection fuel quantity requested	==FALSE FUL_GenericInjSysFlt ==FALSE FHP_InjLeakageFA ==FALSE MAP_SensorFA==FALSE > 105 ppm < 5 ppm > 3.00 sec > 75 kPa < 120 kPa > -9 °C < 80 °C **NOX_S1_PlausChkEnblCmbMode** < 250 kPA For normal combustion mode: > 22.00 mm^3 < 50.00 mm^3 For other combustion modes:	filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						> 20 mm^3 < 42 mm^3		
					Engine speed	For normal combustion mode: > 1,240 rpm < 1,620 rpm For other combustion modes: > 1,620 rpm < 1,225 rpm		
					Engine coolant temperature	> 70 °C < 120 °C		
					Sensor dewpoint is reached	TRUE		
					Diagnostic test results during EWMA FIR mode	< 1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Engine Out NOx Sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window)	< -50.00 ppm > 180.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Engine Out NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.06 % > - 0.06 % > 10.00 sec > 9.90 V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 80.00 g/s > 10.00 g/s < 500.00 mg/s > -1.00 mg/s	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 20.00 g and Engine Out NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 10.00 sampling windows (each one made up of 10.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed is within a range	< 4,500.00 rpm > 800.00 rpm		
					Engine Out NOx Sensor temperature is within a range	< 410.00 °C > -7.00 °C		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 0.01 mm^3/s < 0.00 mm^3 > -1.00 mm^3 > 3.00 s		
					Intake manifold absolute pressure	< 1,000.00 kPa		
					No failure on intake manifold absolute pressure Sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 Sensor	NOX_NOx1_OutOfRngLo 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	NOX_NOx1_DynChkFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Sensor signal dynamic	==FALSE		
					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.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used) - (SW 18.19 and beyond)	P2002	This diagnosis detects a cracked Diesel Particulate FIlter	{The predicted soot sensor filtered by using EWMA filter is} OR {The predicted soot sensor filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	< 1.06 < 1.06 DPF_DPF_EffMontrFA = 1 (true)	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_TurbFlowNotRl b) SOT_ExhTempSootSnsrV ld SOT_TotExhSootSnsrVld NOT (SOT_PM_DPF_UpFlt) > -20.00 °C < 20.00	Test per Trip: 1: If Fast Initial Response (FIR) mode is active then 2.00 test per trip are allowed If Rapid Response (RR) mode is active then 2.00 test per trip are allowed The signal for the monitor check is filtered by means a first-order filter. The filter step change can assume the following values: - 0.80 if FIR is active - 0.50 if RR is active - 0.25 if neither FIR and RR are active Initial filter value: - 1.12 when FIR is activated - 1.12 when RR is activated	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					measurement phase, Duration of Autostop phase	< 200.00 s		
					During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is	<= 1,000.00		
					If EWMA filter is enabled (TRUE--> enable FALSE --> disable) AND	1.00 = 1 (true)		
					number of diagnostic run for driving cycle is	< 1 (when FIR and RR are not active) < 1.00 (when FIR is active) < 1.00 (when RR is active)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Out of Range During Deceleration Bank 1 Sensor 1	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 [%] < -3.25 [%]	Engine running System voltage in range Sensor is fully operative No SQA learning is active Enabled in combustion mode No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE FAD_SQA_LrnET_Enbl == FALSE refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**) < 350.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdlFlt OXY_NOx1SignRngChkFlt FHP_InjLeakageFA EGR_PstnShtOffReqFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) (MAP_SensorFA AND	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_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 3.50 [s]		
					a. Engine speed in operating range	> 600 [rpm] < 3,000 [rpm]		
					b. EGR position	< 60.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 400.00 [mg] < 1,500.00 [mg]		
					Estimated O2 concentration stable i.e. difference between initial and actual value	< 0.20 [%]		
					Air mass flown since fuel cut-off condition	> 0.12 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Post Catalyst NOx Sensor read out of range low	Check if the NOx2 Sensor NOx concentration raw read is out of lower range: NOx raw read	 < -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 Sensor No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag No O2 plausibility in load fault on NOx2	> -1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 9.90 V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_FltSt ==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.
Exhaust Gas Recirculation (EGR) 2 Cooling System Performance	P241F	This monitor checks the LP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	LP EGR Cooler Efficiency (averaged over a calibration cumulative transient time) is compared with a threshold. LP EGR Cooler efficiency is computed as the ratio between (LP EGR cooler upstream temperature - LP EGR cooler downstream temperature) and (LP EGR cooler upstream temperature - LP EGR cooler inlet coolant temperature). Each sample of the computed LP EGR Cooler Efficiency (before the average) is corrected by an offset depending on the LP EGR flow.	< 50.00 [%] **P241F: Efficiency Offset** [%]	Calibration on diagnostic enabling PT Relay voltage in range Engine is running or cranking Difference between LP EGR cooler upstream temperature and LPE cooler inlet coolant temperature Ambient Temperature Ambient pressure Air Control is Active Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature LP EGR flow (filtered) in range, with hysteresis on	1.00 ==TRUE Powertrain relay voltage > 11.00 [V] ==TRUE > 120.00 [°C] < 300.00 [°C] >= -20.00 [°C] >= 69.60 [kPa] Refer to "Air Control Active" Free Form > 60.00 [°C] ==TRUE < 130.00 [°C] > 5.00 [g/s] (ENABLE) < 2.00 [g/s] (DISABLE)	Test executed after 200.00 samples are collected and their average is computed functional task 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the minimum threshold	< 40.00 [g/s]		
					for a time	>= 12.00 [s]		
					LP EGR flow estimation is valid	LPE_VlvTotFlowNotVld ==FALSE		
					Engine speed in range	< 3,000.00 [rpm] > 1,050.00 [rpm]		
					Estimated LP EGR cooler inlet coolant flow	> 8.00 [l/min]		
					LP EGR cooler inlet coolant flow estimation is valid	CECR_SystemFlowEstimate_FA ==FALSE		
					No fault on LP EGR cooler upstream temperature sensor	EGT_SnsrDPF_DwnFA ==FALSE		
					No fault on LP EGR cooler downstream temperature sensor	LPE_TempSnsrFA ==FALSE		
					No fault on LP EGR cooler inlet coolant temperature sensor	EECR_LPE_InletCoolant_FA ==FALSE		
					No fault on Ambient Temperature sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on engine speed	CrankSensor_FA ==FALSE		
					No fault on LP EGR valve	LPE_PstnShtOffReq ==FALSE		

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	40	30	25	25	25	25

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	68	28	-10	-10	-10	-10

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	38	28	22	22	22	22

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	65	25	-13	-13	-13	-13

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during D1 and D3 combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	26	26	26	26	26	26	26	26

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during D4 combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	66	66	66	46	46	46	46	46

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during D1 and D3 combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	23	23	23	23	23	23	23	23

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during D4 combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	63	63	63	43	43	43	43	43

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for 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	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	70	40	25	12	12	12	12	12	12	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in D1 and D3 modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	26	26	26	26	26	26	26	26	26	26	26	26	26

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in D4 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	60	60	60	56	56	46	46	46	46	46	46	46	46

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	70	40	25	12	12	12	12	12	12	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in V3 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	15	15	15	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in V1 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V2

Description: Threshold above which the pressure closed loop control is enabled in V2 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	25	15	12	12	12	12	12	12	12	15	15	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

y/x	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - K_EffExhFlowCond

Description: Enablement table, function of exhaust flow and SCR average temperature [boolean] for SCR NOx catalyst efficiency monitoring (P20EE)

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

y/x	200	210	220	230	240	250	260	270	290	310	330	350	360	380	400
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
20	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
30	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
40	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
50	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
60	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
65	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
70	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
75	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
80	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
90	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
100	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - K_EffExhFlowCond_SCR2

Description: Enablement table, function of exhaust flow upstream SCR2 and SCR2 average temperature [boolean] for SCR2 monitoring (P2C7A)

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

y/x	190	210	220	240	260	270	280	290	300	310	320	340	360	380	400
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
20	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
25	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
30	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
40	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
50	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
60	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
70	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
80	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
90	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADC_n_SQC_HysThrsh

Description: Engine speed hysteresis function of driveline group for SQC enable.

KaFADC_n_SQC_HysThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2
1	10	10	10

KaFADC_n_SQC_HysThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp3	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5
1	10	10	10

KaFADC_n_SQC_HysThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7	CeFADR_e_CWA_DrivelineGrp8
1	10	10	10

KaFADC_n_SQC_HysThrsh - Part 4

y/x	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
1	10	10	

Initial Supporting table - m_NH3_StrgDevErrMax_SCR2

Description: Upper boundary of SCR2 NH3 storage deviation error [g] (difference between SCR2 estimated storage and its set-point) for SCR2 monitoring (P2C7A)

Value Units: g
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMaxThrsh

Description: Upper boundary of NH3 storage deviation error [g] (difference between SCR2 estimated storage and its set-point) for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMin_SCR2

Description: Lower boundary of SCR2 NH3 storage deviation error [g] (difference between SCR2 estimated storage and its set-point) for SCR2 monitoring (P2C7A)

Value Units: g
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - m_NH3_StrgDevErrMinThrsh

Description: Lower boundary of NH3 storage deviation error [g] (difference between SCR estimated storage and its set-point) for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgMax_SCR2

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

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

y/x	10	20	30	40	50	60	80	100
220	2	2	2	2	2	2	1	1
250	1	1	1	1	1	1	1	1
280	1	1	1	1	1	1	1	1
300	1	1	1	1	1	1	1	1
320	1	1	1	1	1	1	1	1
340	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1
380	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1

Initial Supporting table - m_NH3_StrgMaxAge_SCR2

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

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

y/x	10	20	30	40	50	60	80	100
220	2	2	2	2	2	2	1	1
250	1	1	1	1	1	1	1	1
280	1	1	1	1	1	1	1	1
300	1	1	1	1	1	1	1	1
320	1	1	1	1	1	1	1	1
340	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1
380	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1

Initial Supporting table - m_NH3_StrgMaxThrsh

Description: Upper boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	2	2	2	2	2	2	2	2

Initial Supporting table - m_NH3_StrgMin_SCR2

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

Value Units: g
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_SlipNOxIntglThrsh_SCR2

Description: NOx integral threshold [mg] to enable SCR2 slip condition based on SCR2 average temperature for SCR2 monitoring (P2C7A)

Value Units: mg
X Unit: °C

y/x	220	270	320	370
1	1,700	1,700	1,700	1,700

Initial Supporting table - 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	1	1	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	240	244	248	252	257	261	265	270	274	278	282	287	291	295	300
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	290	290	296	300

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	240	240	240	240

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	240	244	248	252	257	261	265	270	274	278	282	287	291	295	300
2,600	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-14	-16	-16	-16	-16
2,755	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-14	-16	-16	-16	-16
2,911	-13	-13	-13	-13	-13	-14	-14	-14	-14	-14	-14	-16	-16	-17	-17
3,066	-13	-13	-13	-13	-13	-14	-14	-14	-14	-14	-14	-16	-16	-17	-17
3,222	-14	-14	-14	-14	-13	-14	-14	-14	-15	-15	-14	-17	-17	-18	-18
3,377	-14	-14	-14	-14	-14	-15	-15	-15	-17	-17	-17	-18	-18	-18	-18
3,533	-15	-15	-15	-15	-15	-16	-17	-17	-18	-18	-18	-18	-18	-18	-18
3,688	-15	-15	-15	-15	-16	-17	-18	-18	-18	-18	-18	-18	-18	-18	-18
3,844	-16	-16	-16	-16	-16	-17	-18	-18	-18	-18	-18	-18	-18	-18	-18
4,000	-16	-16	-16	-16	-17	-17	-18	-18	-18	-18	-18	-18	-18	-18	-18

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	240	244	248	252	257	261	265	270	274	278	282	287	291	295	300
2,600	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-14	-16	-16	-16	-16
2,755	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-14	-16	-16	-16	-16
2,911	-13	-13	-13	-13	-13	-14	-14	-14	-14	-14	-14	-16	-16	-17	-17
3,066	-13	-13	-13	-13	-13	-14	-14	-14	-14	-14	-14	-16	-16	-17	-17
3,222	-14	-14	-14	-14	-13	-14	-14	-14	-15	-15	-14	-17	-17	-18	-18
3,377	-14	-14	-14	-14	-14	-15	-15	-15	-17	-17	-17	-18	-18	-18	-18
3,533	-15	-15	-15	-15	-15	-16	-17	-17	-18	-18	-18	-18	-18	-18	-18
3,688	-15	-15	-15	-15	-16	-17	-18	-18	-18	-18	-18	-18	-18	-18	-18
3,844	-16	-16	-16	-16	-16	-17	-18	-18	-18	-18	-18	-18	-18	-18	-18
4,000	-16	-16	-16	-16	-17	-17	-18	-18	-18	-18	-18	-18	-18	-18	-18

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	2,600	2,755	2,911	3,066	3,222	3,377	3,533	3,688	3,844	4,000
1	0	0	0	0	0	0	0	0	0	0

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	240	244	248	252	257	261	265	270	274	278	282	287	291	295	300
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	180	200	210	230

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

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

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	115	118	121	124	127	130	133	136	139	142	145	148	151	156	160
1,150	8	8	9	10	12	14	17	19	19	25	25	25	32	33	33
1,250	8	9	9	10	12	14	17	19	19	27	28	28	28	34	33
1,350	8	9	9	10	12	14	17	19	19	21	28	28	27	33	33
1,450	8	9	9	10	12	14	17	19	19	21	22	23	25	30	33
1,550	8	9	9	10	12	14	17	19	19	24	24	25	24	30	30
1,650	8	9	9	10	12	14	17	19	20	24	24	25	15	30	30
1,750	8	9	8	10	12	14	19	19	22	24	24	25	10	30	24
1,850	8	9	11	10	11	14	19	19	22	24	24	25	10	30	24
1,950	8	9	11	11	11	14	19	19	22	24	24	25	10	30	20
2,050	8	9	11	11	11	14	19	19	22	24	24	25	10	30	20

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	115	118	121	124	127	130	133	136	139	142	145	148	151	156	160
1,150	5	7	8	10	11	13	15	21	22	25	25	27	32	33	33
1,250	5	7	8	10	11	13	15	21	22	27	28	28	32	34	33
1,350	5	7	8	10	11	13	15	21	22	21	28	28	20	33	33
1,450	5	7	8	10	11	13	17	21	22	25	22	27	27	30	33
1,550	5	7	8	10	11	14	17	21	22	24	24	27	27	30	30
1,650	5	7	8	11	12	14	19	21	22	23	24	27	28	30	30
1,750	5	7	8	11	12	14	19	21	22	23	24	27	28	30	24
1,850	5	7	8	11	12	15	19	21	22	23	24	26	28	30	24
1,950	5	7	8	11	12	15	19	21	22	23	24	25	25	30	20
2,050	5	7	8	11	12	15	19	21	22	23	24	25	25	30	20

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	1,150	1,250	1,350	1,450	1,550	1,650	1,750	1,850	1,950	2,050
1	2	2	2	1	1	1	1	1	1	1

Initial Supporting table - P0401, P131F: EGR flow monitor enabling

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

Value Units: boolean
X Unit: enum

P0401, P131F: 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, P131F: 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	1	1	0

P0401, P131F: 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, P131F: 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, P131F: 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, P131F: 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, P131F: 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, P131F: 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, P131F: 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 HP EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient HP EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient HP EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient HP EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	-104	-128	-128	-128	-80	-144	-128	-120
5	-112	-208	-208	-208	-168	-208	-192	-184
7	-112	-216	-216	-224	-224	-224	-224	-216
9	-120	-232	-232	-232	-232	-224	-224	-232
11	-128	-232	-232	-232	-232	-224	-240	-248
13	-128	-216	-224	-224	-224	-216	-232	-240
15	-120	-208	-216	-216	-216	-208	-208	-152
17	-128	-192	-208	-200	-208	-184	-160	-88
19	-144	-184	-208	-184	-184	-144	-112	-88

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	-104	-128	-128	-128	-80	-144	-128	-120
5	-112	-208	-208	-208	-168	-208	-192	-184
7	-112	-216	-216	-224	-224	-224	-224	-216
9	-120	-232	-232	-232	-232	-224	-224	-232
11	-128	-232	-232	-232	-232	-224	-240	-248
13	-128	-216	-224	-224	-224	-216	-232	-240
15	-120	-208	-216	-216	-216	-208	-208	-152
17	-128	-192	-208	-200	-208	-184	-160	-88
19	-144	-184	-208	-184	-184	-144	-112	-88

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	-104	-128	-128	-128	-80	-144	-128	-120
5	-112	-208	-208	-208	-168	-208	-192	-184
7	-112	-216	-216	-224	-224	-224	-224	-216
9	-120	-232	-232	-232	-232	-224	-224	-232
11	-128	-232	-232	-232	-232	-224	-240	-248
13	-128	-216	-224	-224	-224	-216	-232	-240
15	-120	-208	-216	-216	-216	-208	-208	-152
17	-128	-192	-208	-200	-208	-184	-160	-88
19	-144	-184	-208	-184	-184	-144	-112	-88

Initial Supporting table - P0401: Insufficient HP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1,100	1,200	1,300	1,400	1,500	1,600	1,650	1,700
64	22	22	22	22	22	22	22	22
68	22	22	22	22	22	22	22	22
72	22	22	22	22	22	22	22	22
76	22	22	22	22	22	22	22	22
80	22	22	22	22	22	22	22	22
84	22	22	22	22	22	22	22	22
88	22	22	22	22	22	22	22	22
92	22	22	22	22	22	22	22	22
96	22	22	22	22	22	22	22	22
100	22	22	22	22	22	22	22	22
104	22	22	22	22	22	22	22	22

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	1,100	1,200	1,300	1,400	1,500	1,600	1,650	1,700
64	3	3	3	3	3	3	3	3
68	3	3	3	3	3	3	3	3
72	3	3	3	3	3	3	3	3
76	3	3	3	3	3	3	3	3
80	3	3	3	3	3	3	3	3
84	3	3	3	3	3	3	3	3
88	3	3	3	3	3	3	3	3
92	3	3	3	3	3	3	3	3
96	3	3	3	3	3	3	3	3
100	3	3	3	3	3	3	3	3
104	3	3	3	3	3	3	3	3

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P0401: Insufficient HP EGR intrusive test Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient HP 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 HP EGR intrusive test Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient HP 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 HP EGR flow

Description: Minimum desired HP EGR flow above which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	1,100	1,200	1,300	1,400	1,500	1,600	1,650	1,700
64	0	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient LP EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient LP EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient LP EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	-48	-48	-48	-48	-48	-48	-48	-48
14	-48	-48	-48	-48	-48	-48	-48	-48
16	-48	-48	-48	-48	-48	-48	-48	-48
18	-48	-48	-48	-48	-48	-48	-48	-48
20	-48	-48	-48	-48	-48	-48	-48	-48
22	-48	-40	-40	-48	-48	-48	-48	-48
23	-40	-32	-32	-40	-48	-48	-40	-40
25	-32	-24	-24	-32	-40	-40	-32	-24
27	-24	-24	-24	-24	-32	-32	-24	-24

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	-48	-48	-48	-48	-48	-48	-48	-48
14	-48	-48	-48	-48	-48	-48	-48	-48
16	-48	-48	-48	-48	-48	-48	-48	-48
18	-48	-48	-48	-48	-48	-48	-48	-48
20	-48	-48	-48	-48	-48	-48	-48	-48
22	-48	-40	-40	-48	-48	-48	-48	-48
23	-40	-32	-32	-40	-48	-48	-40	-40
25	-32	-24	-24	-32	-40	-40	-32	-24
27	-24	-24	-24	-24	-32	-32	-24	-24

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	-48	-48	-48	-48	-48	-48	-48	-48
14	-48	-48	-48	-48	-48	-48	-48	-48
16	-48	-48	-48	-48	-48	-48	-48	-48
18	-48	-48	-48	-48	-48	-48	-48	-48
20	-48	-48	-48	-48	-48	-48	-48	-48
22	-48	-40	-40	-48	-48	-48	-48	-48
23	-40	-32	-32	-40	-48	-48	-40	-40
25	-32	-24	-24	-32	-40	-40	-32	-24
27	-24	-24	-24	-24	-32	-32	-24	-24

Initial Supporting table - P049B: Insufficient LP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient LP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
69	0	0	0	0	0	0	0	0
70	0	25	25	25	25	25	25	0
72	0	25	25	25	25	25	25	0
76	0	25	25	25	25	25	25	0
80	0	25	25	25	25	25	25	0
84	0	25	25	25	25	25	25	0
88	0	25	25	25	25	25	25	0
92	0	25	25	25	25	25	25	0
96	0	25	25	25	25	25	25	0
100	0	25	25	25	25	25	25	0
104	0	25	25	25	25	25	25	0

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient LP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
69	100	100	100	100	100	100	100	100
70	100	13	13	13	13	13	13	100
72	100	13	13	13	13	13	13	100
76	100	13	13	13	13	13	13	100
80	100	13	13	13	13	13	13	100
84	100	13	13	13	13	13	13	100
88	100	13	13	13	13	13	13	100
92	100	13	13	13	13	13	13	100
96	100	13	13	13	13	13	13	100
100	100	13	13	13	13	13	13	100
104	100	13	13	13	13	13	13	100

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow monitor enabling

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

Value Units: boolean
X Unit: enum

P049B: Insufficient LP EGR flow monitor enabling - Part 1

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

P049B: Insufficient LP 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	1	1	0

P049B: Insufficient LP 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

P049B: Insufficient LP 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 - P049B: Minimum desired LP EGR flow

Description: Minimum desired LP EGR flow above which the insufficient LP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
69	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020
70	1,020	120	120	120	120	120	120	1,020
72	1,020	120	120	120	120	120	120	1,020
76	1,020	120	120	120	120	120	120	1,020
80	1,020	120	120	120	120	120	120	1,020
84	1,020	120	120	120	120	120	120	1,020
88	1,020	120	120	120	120	120	120	1,020
92	1,020	120	120	120	120	120	120	1,020
96	1,020	120	120	120	120	120	120	1,020
100	1,020	120	120	120	120	120	120	1,020
104	1,020	120	120	120	120	120	120	1,020

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for all others combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P140B, P140C: HP EGR slow response enabling

Description: Calibration map for the enabling of HP EGR slow response monitoring, function of combustion mode.

Value Units: boolean

P140B, P140C: HP 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: HP 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: HP 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: HP 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 HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	60	60	60	60	60	0	0	0
72	60	60	60	60	60	0	0	0
76	60	60	60	60	60	0	0	0
80	60	60	60	60	60	0	0	0
84	60	60	60	60	60	0	0	0
88	60	60	60	60	60	0	0	0
92	60	60	60	60	60	0	0	0
96	60	60	60	60	60	0	0	0
100	60	60	60	60	60	0	0	0
104	60	60	60	60	60	0	0	0

Initial Supporting table - P140B: Increasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	0	0	0	0	0	70	70	70
72	0	0	0	0	0	70	70	70
76	0	0	0	0	0	70	70	70
80	0	0	0	0	0	70	70	70
84	0	0	0	0	0	70	70	70
88	0	0	0	0	0	70	70	70
92	0	0	0	0	0	70	70	70
96	0	0	0	0	0	70	70	70
100	0	0	0	0	0	70	70	70
104	0	0	0	0	0	70	70	70

Initial Supporting table - P140B: Increasing HP EGR slow response threshold

Description: Threshold for increasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	72	83	96
1	14	14	14

Initial Supporting table - P140C: Decreasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	60	60	60	60	60	0	0	0
72	60	60	60	60	60	0	0	0
76	60	60	60	60	60	0	0	0
80	60	60	60	60	60	0	0	0
84	60	60	60	60	60	0	0	0
88	60	60	60	60	60	0	0	0
92	60	60	60	60	60	0	0	0
96	60	60	60	60	60	0	0	0
100	60	60	60	60	60	0	0	0
104	60	60	60	60	60	0	0	0

Initial Supporting table - P140C: Decreasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	0	0	0	0	0	70	70	70
72	0	0	0	0	0	70	70	70
76	0	0	0	0	0	70	70	70
80	0	0	0	0	0	70	70	70
84	0	0	0	0	0	70	70	70
88	0	0	0	0	0	70	70	70
92	0	0	0	0	0	70	70	70
96	0	0	0	0	0	70	70	70
100	0	0	0	0	0	70	70	70
104	0	0	0	0	0	70	70	70

Initial Supporting table - P140C: Decreasing HP EGR slow response threshold

Description: Threshold for decreasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	72	83	96
1	5	5	5

Initial Supporting table - P14A5, P14A6: LP EGR slow response enabling

Description: Calibration map for the enabling of LP EGR slow response monitoring, function of combustion mode.

Value Units: boolean

P14A5, P14A6: LP EGR slow response enabling - Part 1

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

P14A5, P14A6: LP 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	1	1	0

P14A5, P14A6: LP 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

P14A5, P14A6: LP 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 - P14A5: Increasing LP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the increasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	10	10	10	10	10	10	10	10
70	50	50	50	50	50	10	10	10
72	50	50	50	50	50	10	10	10
76	50	50	50	50	50	10	10	10
80	50	50	50	50	50	10	10	10
84	50	50	50	50	50	10	10	10
88	50	50	50	50	50	10	10	10
92	50	50	50	50	50	10	10	10
96	50	50	50	50	50	10	10	10
100	50	50	50	50	50	10	10	10
104	50	50	50	50	50	10	10	10

Initial Supporting table - P14A5: Increasing LP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the increasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	50	50	50	50	50	50	50	50
70	10	10	10	10	10	50	50	50
72	10	10	10	10	10	50	50	50
76	10	10	10	10	10	50	50	50
80	10	10	10	10	10	50	50	50
84	10	10	10	10	10	50	50	50
88	10	10	10	10	10	50	50	50
92	10	10	10	10	10	50	50	50
96	10	10	10	10	10	50	50	50
100	10	10	10	10	10	50	50	50
104	10	10	10	10	10	50	50	50

Initial Supporting table - P14A5: Increasing LP EGR slow response threshold

Description: Threshold for increasing LP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	20	20	20

Initial Supporting table - P14A6: Decreasing LP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the decreasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	70	70	70	70	70	0	0	0
72	70	70	70	70	70	0	0	0
76	70	70	70	70	70	0	0	0
80	70	70	70	70	70	0	0	0
84	70	70	70	70	70	0	0	0
88	70	70	70	70	70	0	0	0
92	70	70	70	70	70	0	0	0
96	70	70	70	70	70	0	0	0
100	70	70	70	70	70	0	0	0
104	70	70	70	70	70	0	0	0

Initial Supporting table - P14A6: Decreasing LP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the decreasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	0	0	0	0	0	70	70	70
72	0	0	0	0	0	70	70	70
76	0	0	0	0	0	70	70	70
80	0	0	0	0	0	70	70	70
84	0	0	0	0	0	70	70	70
88	0	0	0	0	0	70	70	70
92	0	0	0	0	0	70	70	70
96	0	0	0	0	0	70	70	70
100	0	0	0	0	0	70	70	70
104	0	0	0	0	0	70	70	70

Initial Supporting table - P14A6: Decreasing LP EGR slow response threshold

Description: Threshold for decreasing LP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	15	15	15

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	400	500	650	800	1,000	1,250	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16

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	400	500	650	800	1,000	1,250	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

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	400	500	650	800	1,000	1,250	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16

Initial Supporting table - P241F: Efficiency Offset

Description: Offset used to correct the computed LP EGR cooler efficiency. It is function of the LP EGR flow.

Value Units: [%]
X Unit: [g/s]

y/x	0	10	20	30	40
1	0	2	4	6	8

Initial Supporting table - 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 - t_DerTempDsblTmr

Description: Disabling timer based on the time derivative of SCR average temperature [s] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: s
X Unit: °C/s

y/x	-10	-5	-3	-1	1	3	5	10
1	30	20	10	5	5	10	20	30

Initial Supporting table - t_DerTempDsblTmr_SCR2

Description: Disabling timer based on the time derivative of SCR2 average temperature [s] for SCR2 monitoring (P2C7A)

Value Units: s
X Unit: °C/s

y/x	-10	-5	-3	-1	1	3	5	10
1	25	20	10	5	5	10	20	25

Initial Supporting table - T_MaxTempGrad

Description: Upper boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	30	40	50	50	50	50	50	50

Initial Supporting table - T_MaxTempGrad_SCR2

Description: Upper boundary of SCR2 temperature gradient (difference between SCR2 upstream and SCR2 downstream temperature) [°C] for SCR2 monitoring (P2C7A)

Value Units: °C
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	20	20	20	25	25	25	25	25

Initial Supporting table - T_MinTempGrad

Description: Lower boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	-30	-40	-50	-50	-50	-50	-50	-50

Initial Supporting table - T_MinTempGrad_SCR2

Description: Lower boundary of SCR2 temperature gradient (difference between SCR2 upstream and SCR2 downstream temperature) [°C] for SCR2 monitoring (P2C7A)

Value Units: °C
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	-20	-20	-20	-25	-25	-25	-25	-25

Initial Supporting table - t_NOxFlowIncDsblTmr

Description: Debounce time to wait after the NOx flow becomes in range [sec] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: sec
X Unit: mg/sec
Y Units: sec

y/x	1	1	2	2	5	6	10
50	2	2	5	5	25	25	30
60	2	2	5	5	25	25	30
70	2	2	5	5	40	40	45
80	2	2	5	5	40	40	45
90	2	2	5	5	40	40	45
100	2	2	5	5	40	40	45
150	2	2	5	5	40	40	45
300	2	2	5	5	40	40	45

Initial Supporting table - CatCrtdEffRepEWMA

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Catalyst EWMA filter enabled and Catalyst conversion inefficiency previously detected (Catalyst FA = TRUE)

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000

Initial Supporting table - CatCrtdEffThrsh

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (fault threshold) as function of ambient temperature [K]

X Unit: Outside Air Temperature
Y Units: Minimum catalyst efficiency

y/x	250.00	266.00	282.00	298.00	314.00	340.00
1.00	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

Initial Supporting table - CatCrtdMaxFuel

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

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

Initial Supporting table - 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_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_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 - 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 - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-100	-80	-51	-50	-40	0	40	44	45	60	75
-100	0	0	0	0	0	0	0	0	0	0	0
-51	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
52	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - 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	1	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_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out 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_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst 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	1	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	1	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	1	1	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	1	1	1	1	

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	30	35	40	45	50	55	60	65	70
1	66	61	55	50	46	43	42	40	38

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_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_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 - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: MPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-100	-80	-51	-50	-40	0	40	44	45	60	75
-100	0	0	0	0	0	0	0	0	0	0	0
-51	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
52	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - 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	1	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	1,750	1,750	1,750	1,750
1	1,750	1,750	1,750	1,750
2	1,750	1,750	1,750	1,750
3	1,750	1,750	1,750	1,750
4	1,750	1,750	1,750	1,750

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	1,750	1,750	1,750	1,750
1	1,750	1,750	1,750	1,750
2	1,750	1,750	1,750	1,750
3	1,750	1,750	1,750	1,750
4	1,750	1,750	1,750	1,750

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,750	1,750	1,750	
1	1,750	1,750	1,750	
2	1,750	1,750	1,750	
3	1,750	1,750	1,750	
4	1,750	1,750	1,750	

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	1,100	1,100	1,100	1,100
1	1,100	1,100	1,100	1,100
2	1,100	1,100	1,100	1,100
3	1,100	1,100	1,100	1,100
4	1,100	1,100	1,100	1,100

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	1,100	1,100	1,100	1,100
1	1,100	1,100	1,100	1,100
2	1,100	1,100	1,100	1,100
3	1,100	1,100	1,100	1,100
4	1,100	1,100	1,100	1,100

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,100	1,100	1,100	
1	1,100	1,100	1,100	
2	1,100	1,100	1,100	
3	1,100	1,100	1,100	
4	1,100	1,100	1,100	

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_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_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 - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: MPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-100	-80	-51	-50	-40	0	40	44	45	60	75
-100	0	0	0	0	0	0	0	0	0	0	0
-51	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
52	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADR_e_FSA_CombModeEnblGrp

Description: Enable FSA learning based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeEnblGrp - Part 1

y/x	CeCMBR_e_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_Grp1	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_Grp1

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_Grp1	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_Grp1	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 - KtFADD_K_FSA_ECM_PresAmbWghtHi

Description: Curve of the weighting factor dependent on ambient pressure for P026D

Value Units: -
X Unit: kPa

y/x	72	83	96
1	1	1	1

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtLo

Description: Curve of the weighting factor dependent on ambient pressure for P026C

Value Units: -
X Unit: kPa

y/x	72	83	96
1	1	1	1

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp1

Description: Map to define P026D threshold for combustion mode Group 1

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

y/x	15	20	25	30	35	40	45	50	55	60
1,100	7	7	7	7	7	7	7	7	7	7
1,200	7	7	7	7	7	7	7	7	7	7
1,300	7	7	7	7	7	7	7	7	7	7
1,400	8	8	8	8	7	7	7	7	7	7
1,500	8	8	8	8	7	7	7	7	7	7
1,600	9	8	8	9	7	7	7	7	7	7
1,700	9	9	9	9	8	8	8	8	8	8
1,800	9	8	8	9	8	8	8	8	8	8

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp2

Description: Map to define P026D threshold for combustion mode Group 2

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

y/x	15	20	25	30	35	40	45	50	55	60
1,100	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,300	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,500	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,700	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp3

Description: Map to define P026D threshold for combustion mode Group 3

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

y/x	15	20	25	30	35	40	45	50	55	60
1,100	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,300	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,500	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,700	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp1

Description: Map to define P026C threshold for combustion mode Group 1

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

y/x	15	20	25	30	35	40	45	50	55	60
1,100	-4	-4	-3	-4	-5	-5	-5	-5	-5	-5
1,200	-3	-4	-4	-4	-4	-5	-5	-5	-5	-5
1,300	-4	-4	-4	-4	-4	-6	-7	-7	-7	-7
1,400	-4	-4	-4	-4	-4	-5	-7	-6	-6	-6
1,500	-4	-4	-4	-4	-5	-5	-6	-6	-6	-6
1,600	-4	-4	-4	-4	-5	-5	-6	-5	-5	-5
1,700	-5	-5	-5	-4	-5	-6	-6	-7	-7	-7
1,800	-6	-6	-6	-5	-5	-5	-5	-5	-5	-5

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp2

Description: Map to define P026C threshold for combustion mode Group 2

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

y/x	15	20	25	30	35	40	45	50	55	60
1,100	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,300	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,500	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,700	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp3

Description: Map to define P026C threshold for combustion mode Group 3

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

y/x	15	20	25	30	35	40	45	50	55	60
1,100	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,300	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,500	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,700	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3