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 the cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-10.0 Crank Degrees 10.0 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning No Active DTCs: Time since last execution of diagnostic	 CrankSensor_FA P0340, P0341 < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. One sample per cam rotation	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		internal combustion engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.				EngineModeNotRunTimer Error		
			<u>Engine Running:</u> If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 15.0 deg C > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	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:	>= 12.4 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_DefaultDetected 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 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	<= 64 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	>= 292,870 Ohms (~-60 deg C)	Continuous		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic signal in the Outside Air Temperature (OAT) circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”. Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings		Continuous	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Too Low	P0087	Determine if rail pressure is below an absolute value.	Rail pressure	< 0 to 13 MPa (see table **P0087 Minimum rail pressure**)	Run crank voltage Engine running, cranking excluded No IFT running (refer to FUL_IFT_St)	≥ 11.0 V	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 (OBD2)	P0089	Determine when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 67 to 217 MPa (see table **P0089 Maximum rail pressure with MU**)	Run crank voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*)	≥ 11.0 V	160 failures out of 229 samples OR 160 continuous failures out of 229 samples 6.25 ms/sample	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit Low Voltage	P0091	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground: impedance between signal and controller ground	≤ 0.5 Ω	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_MU_DrvrCloseTFTKO FHP_MU_DrvrOpenTFTKO	44 failures out of 88 samples 6.25 ms/sample	Type B, 2 Trips

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

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

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 if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 2 readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Multiple Pressure Sensor Correlation Performance (US Market - 3 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] AND > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] AND > **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		
			Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure TCIAP Pressure TCIAP Pressure No Active DTCs: No Pending DTCs:	> 5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

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

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	< 47.50 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 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	> 400,000 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 3 readings	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type 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 Low	P00F4	Detects a continuous short to ground in the humidity signal circuit or a humidity sensor that is outputting a duty cycle that is too low. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit High	P00F5	Detects a humidity sensor that is outputting a duty cycle signal that is too high. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	>= 95.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure (MAP) Sensor Performance (US Market - 3 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	< 50.0 [kPa] > 115.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 421.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (applications with IAT, IAT2 and IAT3)	P0111	Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and IAT3 sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT2 and IAT3 values are similar, and the IAT value is not similar to the IAT2 and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT2 and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C > 25 deg C <= 25 deg C	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, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	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 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	< 47.50 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	> 400,000 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic signal in the Intake Air Temperature (IAT) circuit by monitoring the IAT sensor and failing the diagnostic when the IAT signal has a noisier output than is expected. When the value of the IAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT readings. The result of this summation is called a “string length”. Since the IAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT readings	Continuous		4 failures out of 3 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 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 High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60ºC)	> 134,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	13.0 seconds -60.0 Deg C 150.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ***************************** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 19 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 71 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 50 °C when Ambient min is ≤ 10 °C and > -7 °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 ≤ 87 % ≥ 0.50 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 B, 2 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 > -7 °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 ≤ 71 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Performance (OBD2, 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 (see **P0181 Fuel Temperature Sensor Reference**)	> 20.0 °C to 20.0 °C (see table **P0181 Fuel Temperature Plausibility**)	Run crank voltage Run crank voltage FTZM Run crank voltage Engine not cranking A time and is passed since engine movement is detected Engine soak time No error for Engine Not Running timer (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "*OBD Coolant Enable Criteria*" section)) Sensor Bus Relay commanded on No DTC active:	> 6.0 V ≥ 11.0 V ≥ 11.0 > 8 s < 13 s > 28,799 s > -40 °C = TRUE FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	0 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	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	< 50 Ω	Run crank voltage Run crank voltage Engine not cranking	> 6.0 V ≥ 11.0 V	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit Intermittent	P0184	Determine when fuel temperature sensor changes quicker than expected, likely due to an intermittent fault.	Fuel temperature	> (1 - α) * 156 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage No active DTC:	> 6.0 V ≥ 11.0 V FTS_FTS_CktFA	100 failures out of 150 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	< (1 - α) * -56 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage No active DTC:	> 6.0 V ≥ 11.0 V FTS_FTS_CktFA	100 failures out of 150 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_MinPres Variance ; Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Sensed fuel pressure change [absolute value, during intrusive test]	<= 30 kPa	a) Diagnostic enabled [FDBR_b_FPSS_DiagEnbld] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] c1) Fuel Flow Rate Valid c2) FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTC P12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTC P129F] c8) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_Info1_UcodeCmFA DTC P165C] c9) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	a) == TRUE b) >= 5.00 seconds c1) == TRUE c2) <> TRUE c3) <> TRUE c4] <> TRUE c5) <> TRUE c6) <> TRUE c7) <> TRUE c8) <> TRUE c9] <> TRUE	1 sample / 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					c10) Fuel Pump Duty Cycle Fault Active	c10) <> TRUE		
					c11) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c11) == CeFDBR_e_WiredTo_ECM		
					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_ECM == 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_ECM == 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_ECM <> 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_ECM == 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_ECM == 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_ECM <> WiredTo FTZM, then see Case1		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle.	For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ***************************** Type cal above = 0 (non - heated t-stat) == == == ==		No Active DTC's	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA	30 failures out of 60 samples 1 sample / second Continuous	Type B, 2 Trips
					Engine Runtime	≥ 30.0 seconds		
			Engine coolant temperature	≤ 70.0 Deg C	Distance traveled this key cycle	≥ 1.2 km		
			***************************** Type cal above = 1 (Electrically heated t-stat) == == == ==		Ambient air pressure	≥ 55.0 kPa		
					Ambient air temperature	≥ -7.0 Deg C		
					**************************			
			Engine coolant temperature	≤ 70.5 Deg C	Engine coolant temperature			
					At least once during the key cycle			
					Type 0 (non-heated t-stat)	≥ 71 Deg C		
					Type 1 (Electrically heated T-stat)	≥ 71.5 to 86.5 Deg C		
					**************************			
					Heat to coolant	≥ 20.0 kW		
					DFCO time	≤ 2.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Thermostat duty cycle	≤ 20.0 %		
					RPM	≤ 5,000		
					Active Fuel Management is not in	Half Cylinder Mode		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger "A" Overboost Condition	P0234	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent negative control deviation of the boost pressure indicating an overboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the overboost pressure monitor is to detect obstructions in the exhaust pipe. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to an obstruction) that leads to exceed the emission limits.	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) lower than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control active)** [kPa] x **P0234, P2263: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] x **P0234, P2263: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -7.00 [°C] AND < 55.00 [°C] > -2 [kPa/s] AND < 3 [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	> 1,600.00 [rpm] AND < 1,700.00 [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 > -7.00 [°C] AND < 55.00 [°C] > -2 [kPa/s] AND < 3 [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	> 900.00 [rpm] AND < 1,600.00 [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.
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.	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 > **IdleSCD_Decel** AND > **IdleSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **IdleCyl_Decel** AND > **IdleCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT 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 -7 ºC < ECT < 141 ºC < -7 ºC 21 ºC < ECT < 141 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 any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.	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.
			****************************** **This Feature only used on Diesel engines** Combustion Modes that force selection of Idle Tables ******************************	************************** **This Feature only used on Diesel engines** **CombustModeIdleTbl** in Supporting Tables **************************			Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	
			Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for	> 3 Engine Cycles				
			(Medres_Decel AND Medres_Jerk)	> **IdleSCD_Decel** * **Random_SCD_Decel** > **IdleSCD_Jerk** * **Random_SCD_Jerk**				
			OR (Medres_Decel AND Medres_Jerk)	> **SCD_Decel** * **Random_SCD_Decel** > **SCD_Jerk** * **Random_SCD_Jerk**				
			OR (Lores_Decel AND Lores_Jerk)	> **IdleCyl_Decel** * **RandomCylModDecel** > **IdleCyl_Jerk** * **RandomCylModJerk**				

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) OR RevBalanceTime PAIRED CYLINDER MISFIRE If a cylinder & it's pair are above PAIR thresholds (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk)	> **CylModeDecel * RandomCylModDecel** > **CylModeJerk** * **RandomCylModJerk** > **RevMode_Decel** * **RandomRevModDecl** > **IdleSCD_Decel** * **Pair_SCD_Decel** > **IdleSCD_Jerk** * **Pair_SCD_Jerk** > **SCD_Decel** * **Pair_SCD_Decel** > **SCD_Jerk** * **Pair_SCD_Jerk** > **IdleCyl_Decel** * **PairCylModeDecel** > **IdleCyl_Jerk** * **PairCylModeJerk** > **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)) BANK MISFIRE Cylinders above Bank Thresholds (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk)	> **CylModeDecel * PairCylModeDecel** > 35 engine cycles out of 100 engine cycles >= 2 cylinders > **IdleSCD_Decel** * **Bank_SCD_Decel** > **IdleSCD_Jerk** * **Bank_SCD_Jerk** > **SCD_Decel** * **Bank_SCD_Decel** > **SCD_Jerk** * **Bank_SCD_Jerk** > **IdleCyl_Decel** * **BankCylModeDecel** >**IdleCyl_Jerk** * **BankCylModeJerk** > **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)	> **IdleSCD_Decel * ConsecSCD_Decel** > **IdleSCD_Jerk * ConsecSCD_Jerk** > **SCD_Decel * ConsecSCD_Decel** > **SCD_Jerk * ConsecSCD_Jerk** > **IdleCyl_Decel * ConsecCylModDecel** > **IdleSCD_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	≥ 4.63 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.	(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		
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
				disable conditions:	Engine Speed	450 < rpm < ((Engine Over Speed Limit) - 250) OR 3,200) Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** or <**ZeroTorqueAFM** if AFM is active	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						in Supporting Tables		
					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 0 cycle delay	
					EGR Intrusive test	Active	4 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 97.00 %	2 Cylinder delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		4 cycle delay	
					Delay if PTO engaged	Enabled		
							******************	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					***************************** **This Feature only used on Diesel engines** Combustion Mode Driver cranks before Wait to Start lamp extinguishes Brake Torque ***************************** 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: Stop filter early: ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed	***************************** = **InfrequentRegen** value in Supporting Tables IF TRUE > 199.99 % Max Torque ***************************** > "**Ring Filter**" # of engine cycles after misfire in Supporting Tables > "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab > 199 %	4 cycle delay **WaitToStart** cycle delay 4 cycle delay ******************	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Auto Transmission	> 1,000 rpm > 3 mph not shifting		
					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	> **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles. abnormal candidates/ total candidates	> 1.00 ratio	discard 100 engine cycle test	
					MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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:			
					Pattern Recog Enabled during Cylinder Deac	Enabled		
						Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Enabled		
					Engine Speed	500 < 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 thresholds in effect at that speed and load.			
					(CylAfter_Accel AND	> Misfire_ decel * **1st_FireAftrMisfr_Acel**		
					CylAfter_Jerk)	> Misfire_Jerk * **1st_FireAftrMisfr_Jerk**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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 * **SnapDecayAfterMisfire**		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					checked to confirm if real misfire is present.		discard 100 engine cycle test	
					Ratio of Unrecog/Recog	> 1.00		
					: NON-CRANKSHAFT BASED ROUGH ROAD:			
					Rough Road Source	Disabled		
					IF Rough Road Source = WheelSpeedInECM	CeRRDR_e_None		
					ABS/TCS Wheel speed noise		discard 100 engine cycle test	
					VSES	active > **WSSRoughRoadThres**		
					IF Rough Road Source = "FromABS"	active	discard 100 engine cycle test	
					ABS/TCS RoughRoad			
					VSES	active detected		
					IF Rough Road Source = "TOSS"	active	discard 100 engine cycle test	
					TOSS dispersion			
					AND No Active DTCs	>**TOSSRoughRoadThres** in supporting tables		
						Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)	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	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = 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	1. Fail counts will occur if the engine goes out synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 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	< 51 > 65	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= 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	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 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.
Exhaust Gas Recirculation (EGR) Flow insufficient (for OBDII market)	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 emission 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 OBDII limits.	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant x **P0401: Insufficient 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 [%] <= 6 [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.
				P0401: Insufficient EGR flow barometric table A (sea level) [mg] x	Fuel request is steady state: |FUEL-FUEL_old|	<= 0.25 [mm^3]		
				P0401: Insufficient EGR flow barometric correction (sea level))	for a minimum number of samples	> 16 [counts]		
				+ (MidBaro Constant x	An air control transition has ended OR Such condition is disabled by calibration	Refer to "Air Control Transition"Free Form OR 1.00 ==TRUE		
				P0401: Insufficient EGR flow barometric table A (mid level) [mg] x	No active transition from a combustion mode to another one	==TRUE		
				P0401: Insufficient EGR flow barometric correction (mid level))	Throttle measured position	> 85.00 [%]		
				+	Outside Air Temperature	> -7.00 [°C]		
				(LoBaro Constant x	Ambient Pressure	> 69.60 [kPa]		
				P0401: Insufficient EGR flow barometric table A (low level) [mg] x	Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 70.00 [°C] ==TRUE		
				P0401: Insufficient EGR flow barometric correction (low level))	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	> 5.00 [mm^3] AND < 60.00 [mm^3]		
					Engine speed	> 750.00 [rpm] AND < 2,000.00 [rpm]		
					No faults on proper temperature sensor	AIC_EGR_FlowDiagAirTempFA ==FALSE		
					All enabling conditions last for a time	> 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow excessive (for OBDII market)	P0402	This monitor detects failures in the air system such to not fulfil the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to higher EGR rate causing the vehicle's emissions to exceed the emission limits. The aim of the EGR flow monitor is to detect HP EGR valve leakages (excessive 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 a leakage) that leads to exceed the OBDII limits.	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	> (SeaBaro Constant x **P0402: Excessive EGR flow barometric table B (sea level)** [mg]) + (MidBaro Constant x **P0402: Excessive EGR flow barometric table B (mid level)** [mg]) + (LoBaro Constant x **P0402: Excessive 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 [%] <= 6 [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.
				P0402: Excessive EGR flow barometric table A (sea level) [mg] x **P0402: Excessive EGR flow barometric correction (sea level)**) + (MidBaro Constant x **P0402: Excessive EGR flow barometric table A (mid level)** [mg] x **P0402: Excessive EGR flow barometric correction (mid level)**) + (LoBaro Constant x **P0402: Excessive EGR flow barometric table A (low level)** [mg] x **P0402: Excessive EGR flow barometric correction (low level)**)	Fuel request is steady state: |FUEL-FUEL_old|	<= 0.25 [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	> -7.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 70.00 [°C] ==TRUE		
					Desired EGR flow	< **P0402: Maximum 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	> 21.00 [mm^3] AND < 36.00 [mm^3]		
					Engine speed	> 1,250.00 [rpm] AND < 1,900.00 [rpm]		
					No faults on proper temperature sensor	AIC_EGR_FlowDiagAirTempFA ==FALSE		
					All enabling conditions last for a time	> 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Range/ Performance	P040B	Determines the EGR temperature Sensor 2 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Down Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **Down Stream Stk Temp Vrtn**	System supply voltage	> 11.00 Volts	Cumulative EGR Flow > 4,000.00 decigrams or [x 1/10 gram] 100 ms/sample, continuous	Type B, 2 Trips
					Engine soak (not run) time	>= 28,800.00 Sec		
					No Active DTCs	P262B		
					Engine is running	Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Low	P040C	Diagnose the EGR Down Stream Temperature sensor circuit low if the feedback of the Down Stream temp sensor is below allowed operating range the sensor is faulted.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 147.00 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 Sensor2 Ckt High	P040D	Diagnose the EGR Down Stream Temperature sensor circuit high if the feedback of the Down Stream temp sensor is above allowed operating range the sensor is faulted	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 885.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	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 Sensor2 Ckt Intermittent/ Erratic	P040E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta change > 25.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	20 failures out of 40 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Range/ Performance	P041B	Determines the EGR temperature Sensor 1 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Up Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **UP Stream Stk Temp Vrtn**	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 Sec P262B Active	cumulative EGR Flow > 300.00 decigrams or [x 1/10 gram] 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Low	P041C	Diagnose the EGR Up Stream Temperature sensor circuit low by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is below the allowed operating range, the sensor is out of range low.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 147.00 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 High	P041D	Diagnose the EGR Up Stream Temperature sensor circuit high by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is above the allowed operating range, the sensor is out of range high.	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 885.00 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 Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 25.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	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 (Regeneration based monitor)	P0421	Regeneration based monitor: 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 cause 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	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 < 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 enabling calibration = TRUE 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 information in fault (Fault Active = TRUE) OR - Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE)	Monitor Enbl Cal = 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]; VeCATD_e_CatSt = TeCATR_e_CatMontrSt.CeCATD_e_MontrDsbld [Enumerative] DPF_DPF_St = TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] OR Injection System Flt = FUL_GenericInjSysFlt OR Amb Temp FA = CAT_OutsideTempFA OR Cat Up Exh Flow Flt = EXF_TotExhCatUpFlt	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 (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) Then: 1 trip (with malfunction) to set DTC (Type A)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Catalyst (CC DOC) monitor. In MY17 sw the mentioned monitor runs in the following below exhaust configurations: - C_UI_SCR_HCI_C_DPF: Close Coupled DOC (Catalyst) --> Urea Injector --> Selective Catalyst Reduction --> Hydro Carbon Injector --> Under Floor DOC (Second Catalyst) --> Diesel Particulate Filter - C_DPF_UI_SCR: Close Coupled DOC (Catalyst) --> Diesel Particulate Filter --> Urea Injector --> Selective Catalyst Reduction			OR - Ambient pressure lower than calibration OR - Ambient temperature lower than calibration OR - Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; Catalyst monitor status can move from DISABLED to TRIGGERED if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient pressure higher than calibration AND	OR Amb Press < 69.90 [KPa] OR Amb Temp < 266.00 [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]; VeCATD_e_CatSt = TeCATR_e_CatMontrSt.CeCATD_e_MontrTrg [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_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 Amb Press > 70.00 [KPa] AND	If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- 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; Catalyst monitor status can move from TRIGGERED to 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	Amb Temp > 266.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 255.99 [°C] AND Cat Up Temp Snsr < 1,500.00 [K]; VeCATD_e_CatSt = TeCATR_e_CatMontrSt.CeCATD_e_MontrEnbl [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND	Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Rapid Response (RR) (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 1 trip (with no mulfunction) to report pass	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - 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 AND - Catalyst up exhaust flow estimation lower than calibration OR if previously Catalyst up exhaust flow estimation higher than calibration then Catalyst up exhaust flow estimation lower than second calibration AND - Catalyst up exhaust flow estimation higher than calibration	Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Amb Press > 70.00 [KPa] AND Amb Temp > 266.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat Up Temp Snsr > 0.00 [K] AND FUL_PostEnbl = TRUE [Boolean] AND Cat Up Exh Flow < 1,000.00 [g/s] OR if previously Cat Up Exh Flow > 1,000.00 [g/s] then Cat Up Exh Flow < 1,000.00 [g/s] AND Cat Up Exh Flow > 0.00 [g/s]	- 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR if previously Catalyst up exhaust flow estimation lower than calibration then Catalyst up exhaust flow estimation higher than second calibration AND - Post injection fuel rate lower than calibration OR if previously Post injection fuel rate higher than calibration then Post injection fuel rate lower than second calibration AND - Post injection fuel rate higher than calibration OR if previously Post injection fuel rate lower than calibration then Post injection fuel rate higer than second calibration AND - Post injection fuel rate higher than calibration OR post injection fuel rate lower than calibration AND timer lower than calibration AND - Catalyst up exhaust temperature (by sensor) lower than calibration OR if previously Catalyst up exhaust temperature (by sensor) higher than	OR if perviously Cat Up Exh Flow < 0.00 [g/s] then Cat Up Exh Flow > 0.00 [g/s] AND Post Inj Fuel Qnty < 1,000.00 [g/s] OR if previously Post Inj Fuel Qnty > 1,000.00 [g/s] then Post Inj Fuel Qnty < 1,000.00 [g/s] AND Post Inj Fuel Qnty > 0.00 [g/s] OR if previously Post Inj Fuel Qnty < 0.00 [g/s] then Post Inj Fuel Qnty > 0.00 [g/s] AND Post Inj Fuel Qnty > -1,000.00 [g/s] OR Post Inj Fuel Qnty < -1,000.00 [g/s] AND Timer < 0.00 [s] AND Cat Up Temp Snsr < 1,000.00 [K] OR if previously Cat Up Temp Snsr > 1,000.00 [K] then Cat Up Temp Snsr <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					calibration then Catalyst up exhaust (by sensor) lower than second calibration AND - Catalyst up exhaust temperature (by sensor) higher than calibration OR if previously Catalyst up exhaust temperature (by sensor) lower than calibration then Catalyst up exhaust temperature (by sensor) higher than second calibration; Oxidation heat release integrator and post injected fuel integrator are both frozen if: - Engine not running (to defreeze Engine running) OR - Catalyst up exhaust flow estimation higher than calibration (to defreeze Catalyst up exhaust flow estimation lower than second calibration) OR - Catalyst up exhaust flow estimation lower than calibration (to defreeze Catalyst up exhaust flow estimation higher than second calibration)	1,000.00 [K] AND Cat Up Temp Snsr > 0.00 [K] OR if previously Cat Up Temp Snsr < 0.00 [K] then Cat Up Temp Snsr > 0.00 [K]; Engine not running [Boolean] (Engine running [Boolean]) OR Cat Up Exh Flow > 1,000.00 [g/s] (Cat Up Exh Flow < 1,000.00 [g/s]) OR Cat Up Exh Flow < 0.00 [g/s] (Cat Up Exh Flow > 0.00 [g/s])		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR - Post injection fuel rate higher than calibration (to defreeze Post injection fuel rate lower than second calibration) OR - Post injection fuel rate lower than calibration (to defreeze Post injection fuel rate higher than second calibration) OR - Post injection fuel rate lower than calibration AND timer higher than calibration (to defreeze Post injection fuel rate higher than calibration) OR - Catalyst up exhaust temperature (by sensor) higher than calibration (to defreeze Catalyst up exhaust temperature (by sensor) lower than second calibration) OR - Catalyst up exhaust temperature (by sensor) lower than calibration (to defreeze Catalyst up exhaust temperature (by sensor) higher than second calibration); Catalyst monitor status can move from ENABLED (oxidation heat release	OR Post Inj Fuel Qnty > 1,000.00 [g/s] (Post Inj Fuel Qnty < 1,000.00 [g/s]) OR Post Inj Fuel Qnty < 0.00 [g/s] (Post Inj Fuel Qnty > 0.00 [g/s]) OR Post Inj Fuel Qnty < -1,000.00 [g/s] AND Timer > 0.00 [s] (Post Inj Fuel Qnty > -1,000.00 [g/s]) OR Cat Up Temp Snsr > 1,000.00 [K] (Cat Up Temp Snsr < 1,000.00 [K] OR Cat Up Temp Snsr < 0.00 [K] (Cat Up Temp Snsr > 0.00 [K]); VeCATD_e_CatSt = TeCATR_e_CatMontrSt.CeCATD_e_MontrDone		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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:	[Enumerative]		
					- DPF regeneration enabled	DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_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 (Fault Active = FALSE)	AND Amb Temp FA = NOT (CAT_OutsideTempFA)		
					AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE)	AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt)		
					AND - Ambient pressure higher than calibration	AND Amb Press > 70.00 [KPa]		
					AND - Ambient temperature higher than calibration	AND Amb Temp > 266.00 [K]		
					AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run	AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					only once per driving cycle) AND - Integrated post injected fuel quantity higher than curve.	only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g].		

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 cause 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 < 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	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]; VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrDsbld [Enumerative] DPF_DPF_St = TeDPFR_e_DPF_St.CeDPFR_e_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 (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) Then: 1 trip (with malfunction) to set DTC (Type A)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Second Catalyst (UF DOC) monitor. In MY17 sw the mentioned monitor only runs in the following below exhaust configuration: - C_UI_SCR_HCI_C_DPF: Close Coupled DOC (Catalyst) --> Urea Injector --> Selective Catalyst Reduction --> Hydro Carbon Injector --> Under Floor DOC (Second Catalyst) --> Diesel Particulate Filter			fault (Fault Flag = TRUE) OR - 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 - Ambient pressure higher	OR Amb Press < 69.90 [KPa] OR Amb Temp < 266.00 [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]; VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrTrg [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_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 Amb Press > 70.00 [KPa]	If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 enabled AND	AND Amb Temp > 266.00 [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]; VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrEnbl [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] AND	Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Rapid Response (RR) (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Sta	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- 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 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 higher than calibration AND - Exhaust injection fuel quantity (by HCI) higher than calibration;	HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Amb Press > 70.00 [KPa] AND Amb Temp > 266.00 [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 > 0.00 [K] AND HCI_InjReleaseSt = TRUE [Boolean] AND Cat2 Up Exh Flow > 0.00 [g/s] AND Exh Inj Fuel Qnty (by HCI) > 0.00 [g];	ndard) - 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 (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if: - Engine not running (to defreeze Engine running) OR - Second Catalyst up exhaust flow estimation lower than calibration (to defreeze Second Catalyst up exhaust flow estimation higher than second calibration) OR - Exhaust injection fuel quantity (by HCI) lower than calibration (to defreeze Exhaust injection fuel quantity (by HCI) higher 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	Engine not running [Boolean] (Engine running [Boolean]) OR Cat2 Up Exh Flow < 0.00 [g/s] (Cat2 Up Exh Flow > 0.00 [g/s]) OR Exh Inj Fuel Qnty (by HCI) < 0.00 [g] (Exh Inj Fuel Qnty (by HCI) > 0.00 [g]); VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrDone [Enumerative]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Aging Index to be compared with the Fault Threshold --> Diagnostic test 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 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.	DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_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 Amb Press > 70.00 [KPa] AND Amb Temp > 266.00 [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.
Fuel Level Sensor 1 Performance [use with a single fuel tank]	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta fuel volume change over 35.2 liters of fuel consumed by the engine.	< 5 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	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 Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 % or 137.45 liters			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out of range high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 % or 3.95 liters			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Open (ODM) (Not used on EREV)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 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]	P0483	Detects inability to control fan speed to desired RPM	Weighted filtered Cooling Fan Speed Differential [Measured - Commanded]	1. <= -500.00 RPM OR 2. >= 500.00 RPM	1. System Performance Test Triggered [FEAD_b_SysPerfTestTrig] 2. Commanded Cooling Fan Output Duty Cycle [FEAR_Pct_PWM_OutputDutyCycle] 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]	1. == TRUE 2. >= 2.00 % 3a. <> TRUE 3b. <> TRUE 3c. <> TRUE 3d. <> TRUE 3e. >= 11.00 volts 3f. >= -7.00 degC 4. == TRUE 5. > 0.60 [dimensionless]	Fail condtion present >= 600.00 ; 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.
Cooling Fan Speed High [Electro-Viscous Engine-Driven]	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) > 1,500.00 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.
Low Engine Speed Idle System	P0506	This DTC indicates that actual engine speed is lower than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient Filter coefficient	> 91.00 rpm 0.00300	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa > 60 °C and < 129 °C ≥ 60 sec 32 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 1.24 mph, 2kph ≤ 25 rpm > 5 sec > 68.00 pct < 25.00 pct PTO not active Transfer Case not in 4WD LowState	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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 FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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 indicates that actual engine speed is higher than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
					Coolant Temp	> 60 °C and < 129 °C Must verify	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
			Filter coefficient	0.00300				
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 mph, 2kph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position	> 68.00 pct		
					or Clutch Pedal Position	< 25.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 5.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type C, No MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 95.00 percent Deadband: < 5 percent or > 95 percent	Oil Pressure Sensor In Use Diagnostic Status	Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type C, No MIL, Special Type C

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]	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_OutputDutyCycle] b) Diagnostic enabled c) Timer - Test Enable	a) >= 36.00 % b) == TRUE c) >= 2.00 seconds	900.00 failures / 1,200.00 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 MIL, Special Type C

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 MIL, Special Type C

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 MIL, Special Type C

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 MIL, Special Type C

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 MIL, 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 MIL, 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 MIL, 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 MIL, 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		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 MIL, 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	10 failures out of / 16 samples Performed on every received message 10 rolling count failures out of / 16 samples Performed on every received messagw	Type C, No MIL, 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 > 8.00 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	20.00	Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	10.00 / 16.00 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 MIL, 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		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 MIL, Special Type C

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 >	1			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 >	0 counts			Diagnostic runs continuously (background loop)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 6.41 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 159 / 399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	5 (results in MIL and remedial action)		CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 1 . (If 0, this test is disabled)	depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 0 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main processor	

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

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

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 MIL, Special Type C

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 MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Open	P0627	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground.	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0629 may also set (Fuel Pump Relay Control Short to Power)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit 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 B, 2 Trips Note: In certain controllers P0627 may also set (Fuel Pump Relay Control Open Circuit)

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vref1 and failing the diagnostic when the percent Vref1 is too low or too high or if the delta between the filtered percent Vref1 and non-filtered percent Vref1 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref1 < or ECM percent Vref1 > or the difference between ECM filtered percent Vref1 and percent Vref1 >	4.875 % Vref1 5.125 % Vref1 0.0495 % Vref1	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	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 signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Low	P0686	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 signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) High	P0687	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 signal and controller power	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	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 C, No MIL, Special Type C

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.
Fuel Pump Driver Control Module System Voltage Performance	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		40 failures out of 50 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 Ignition Switch Run/ Start Position Circuit High	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		72 failures out of 80 samples 50 ms / sample	Type B, 2 Trips
					Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled	= 1		
					Fuel Tank Zone Module (FTZM) serial messages are available			
					Run Crank Active	= FALSE		
					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 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	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	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 in the Turbocharger Boost Control Signal Message Counter	Communication from the Turbo Actuator of the following rolling count content over CAN bus is incorrect		All the following conditions are met for	>= 3.00 seconds	Executes in 10ms loop.	Type A, 1 Trips
					Power Mode	= Run		
					Powertrain Relay Voltage	>= 11.00 Volts		
			Actuator Error for out of total samples	 >= 10 counts >= 10 counts	Run/Crank Ignition Voltage	>= 11.00 Volts		
			or					
			Actuator Status for out of total samples	 >= 10 counts >= 10 counts				
			or					
			Actuator Actual Position for out of total samples	 >= 10 counts >= 10 counts				
			or					
			Actuator Learned Position for out of total samples	 >= 10 counts >= 10 counts				
			or					
			Actuator Learned Relative Position for out of total samples	 >= 10 counts >= 10 counts				
			or					
			Actuator Supply Voltage for out of total samples	 >= 10 counts >= 10 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			or Actuator Temperature for out of total samples	 >= 10 counts >= 10 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A Low	P1015	This monitor checks if the Reductant Control Module SENT Sensor protocol is out of range low	The SENT Message Rolling Pulse Count is provided to the ECM by the DEF-C via CAN bus. This monitor detects a Low Circuit Fault in the SENT Communication Circuit.	SENT Message Rolling Pulse Count sample equals to the previous sample AND Sent Circuit Low Error Message equals to TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A High	P1016	This monitor checks if the Reductant Control Module SENT Sensor protocol is out of range high	The SENT Message Rolling Pulse Count is provided to the ECM by the DEF-C via CAN bus. This monitor detects a High Circuit Fault in the SENT Communication Circuit.	SENT Message Rolling Pulse Count sample equals to the previous sample AND Sent Circuit High Error Message equals to TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A Performance	P1017	This monitor checks if the Reductant Control Module SENT Sensor protocol has performance problems	The SENT Message Rolling Pulse Count and the Reductant Quality Sensor SENT Message Age are provided to the ECM by the DEF-C via CAN bus. This monitor checks if the DEF-C recognizes an error in the SENT trasmission and if the age time is coherent with the Rolling Pulse Count increment.	At least one of the following conditions to be verified: 1. SENT Message Rolling Pulse Count sample is different from the previous sample AND Reductant Quality Sensor SENT Message Age > 1.00 s 2. A SENT Fault is present	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF Quality Sensor SENT circuit	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_SENT_ElecFlt == FALSE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V-W Circuit Open	P1029	This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"] The diagnostic can detect open circuit faults when the fuel pump is not rotating. In the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. This process is completed in less than 1 millisecond. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are	Phased-pair circuit voltage	3V <= V [back-EMF] <= 6V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType c) Diagnostic Enabled - KeFABR_b_OpenCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V-W Circuit Low	P102A	This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground] The diagnostic detects short-to-ground faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair high-side drive is monitored, or 2) in the "stopped" state, small currents are injected into each motor phase circuit pair	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	a) Device configuration FCBR_e_ChassisFuelPresSysType b) Diagnostic KeFABR_b_GshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.	Phased-pair circuit voltage	V [back-EMF] >= 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPresSysType c) Diagnostic KeFABR_b_GshtCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V-W Circuit High	P102B	This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery] The diagnostic detects short-to-battery faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair low-side current shunt is monitored, or 2) in the "stopped" state, small currents are injected	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	a) Device configuration FCBR_e_ChassisFuelPresSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.	Phased-pair circuit voltage Difference	Vdelta > 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V-W Circuit Shorted	P102C	The fuel pump 3phase bridge driver [FTZM embedded] is capable of phase-to-phase circuit fault detection during the intrusive diagnostic phase (MOSFETs off, pump stopped and intrusive diagnostic test executed). The bridge driver is polled by the microcontroller once after successful completion of the intrusive diagnostic. The intrusive diagnostic is re-executed if the circuit fault is not removed and the pump initialization fails its motor alignment phase (an indication of a permanent fault). Diagnostic software [FABR ring] processes the data in a state transition diagnostic. In the "stopped" state, each motor phase circuit driver pair is enabled for a short duration and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage difference falls into a specific range relative to 1/2 source voltage.	Phased-pair circuit voltage Difference	Vdelta > 3 V [relative to 1/2 source input voltage]	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType c) Diagnostic Enabled [KeFABR_b_PshtCktDiagEnbl] d) CAN Sensor Bus message $3EC_Available 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	1 sample / 100 msec	Type A, 1 Trips

<table>
<tr><th>Component/ System</th><th>Fault Code</th><th>Monitor Strategy Description</th><th>Malfunction Criteria</th><th>Threshold Value</th><th>Secondary Parameters</th><th>Enable Conditions</th><th>Time Required</th><th>MIL Illum.</th></tr>
<tr>
<td>Cold Start Fuel Injection Performance</td>
<td>P1037</td>
<td>This monitor detects failures in the application of the correct coolant compensations to fuel injection system setpoint during cold start. The injection system diagnostic monitors that energizing time programmed by the SW for each injection pulse (that is the fuel quantity) is correctly driven by the ECU (ET width and sequence for each stroke and for each cylinder are checked).</td>
<td>In order to identify whether there is a fault on an injector, the following tests shall be performed:

1. At least one dropped pulse is present (i.e. at least one pulse programmed by the application software is not driven by the ECU)

2.
| ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyl) | > calibratable threshold

where

ETpulseX,HWIO (cyl)) = energizing time feedback read by HWIO for pulseX and on cylinder cyl

ETpulseX,programmed (cyl) = ETpulseX,SW (cyl) + EOIpulseX,HWIO (cyl) = energizing time programmed by SW for pulseX and on cylinder cyl (end of injection is not included) +
end of injection feedback read by HWIO for pulseX and on cylinder cyl</td>
<td>10.00 [sec]</td>
<td>Test enabled by calibration

Powertrain relay voltage in range

Engine is running

A boolean calibration mask shall be able to determine for each combustion mode whether the monitoring shall be active or not

No transition / ramp between combustion modes is on going

Engine coolant temperature is inside a calibratable range (based on one hysteresis for high threshold and one for low threshold)

Calibratable boolean map depending on engine speed and fuel request: monitoring shall be activated if interpolated map output is greater than calibratable threshold;</td>
<td>1.00 [boolean]

Powertrain relay voltage > 11.00 [V]

==TRUE

P1037 Cold Start Fuel Injection Performance - COMB MODE

==TRUE

20.00 [Celsius] < ECT < 60.00 [Celsius]

interpolated map output > 0.50

==TRUE</td>
<td>60.00 failures out of 30.00 tests

Function task: angular-based</td>
<td>Type B, 2 Trips</td>
</tr>
</table>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					At least one injection pulse is requested by the application software			

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	 ≥ 100.0 ºC ≥ 20.0 and < 100.0 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 ================== Block Heater is **detected**	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 ≥ -7 ºC = False ================== ≥ 20.0 ºC and < 100.0 ºC < 100.0 Seconds ==================	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sensor3 by 20.0 ºC and the time spent cranking the engine without starting is ≥ 100.0 seconds with the LowFuelConditionDiag	= False	and diagnostic is aborted when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints			
					1b) Drive time	> 400 Seconds with		
					1c) Vehicle speed	> 14.9 MPH and		
					1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows:	0.50 times the seconds with vehicle speed below 1b		
					1e) IAT drops from power up IAT	≥ 5.0 ºC		
					2a) ECT monitoring is enabled after engine start in the following engine run time window	1.0 <= seconds <= 40.0		
					2b) Sensor1 temp derivative during the test is:	< -0.10 ºC/sec		
					2c) Consectutive samples of 2b) being true are:	≥ 4 samples		
					================= Diagnostic is **aborted** when 3) or 4) occurs:	==================		
					3) Engine run time with vehicle speed below 1b	≥ 1,800 Seconds		
					4) Engine off time (i.e. auto stop) during Block heater detection	≥ 900.0 Seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module 5V Reference 1 Circuit	P1176	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 1 Circuit	Raw Fuel Pump Driver Control Module 5V Reference 1 is or Raw Fuel Pump Driver Control Module 5V Reference 1 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent < 87.75 Percent > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zome Module is not lost	Enable >= 11.00 Volts Is not active Commanded on	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 1 is	> 92.25 Percent	Diagnostic is enabled	Enable	Executes in 12.5ms loop.	Type A, 1 Trips
			or		Run/Crank Ignition Voltage	>= 11.00 Volts		
			Raw Fuel Pump Driver Control Module 5V Reference 1 is	< 87.75 Percent	U0076	Is not active		
			or		PT Sensor Bus Relay	Commanded on		
			Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 is	> 0.90 Percent	Communication with the Fuel Tank Zome Module is not lost			
			For a non-continuous failure of	40.00 counts				
			out of	80.00 counts				
			For a continuous failure of	0.20 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module 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 Zome Module is not lost	Enable >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms 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 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 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 Zome Module is not lost	Enable >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms 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 Command Signal Message Counter Incorrect	P11FF	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Pump Command Signal Message Counter	Communication of the Fuel Pump Command Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for	>= 8 counts	All the following conditions are met for	>= 3.00 seconds	Executes in 10ms loop.	Type A, 1 Trips
					Power Mode	= Run		
					Powertrain Relay Voltage	>= 11.00 Volts		
					Run/Crank Ignition Voltage	>= 11.00 Volts		
			out of total samples	>= 10 counts				

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	>= 8 counts	All the following conditions are met for	>= 3.00 seconds	Executes in 10ms loop.	Type B, 2 Trips
					Power Mode	= Run		
					Powertrain Relay Voltage	>= 11.00 Volts		
					Run/Crank Ignition Voltage	>= 11.00 Volts		
			out of total samples	>= 10 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions. The FTZM ERFS control may adjust the PWM slew rate or frequency as a self-protection method, but may not reduce pump rotational speed or impact pumping performance in any way due to an over-temperature condition.	Fuel Pump Driver Temperature	T > 160 degC	a) Diagnostic enabled [KeFABR_b_OvertempDiagEnbl] b) Sensor Bus Relay On c) CAN Sensor Bus message $3EC_Available d) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == TRUE b) == TRUE c) == TRUE d) <> TRUE	5.00 failures / 10.00 samples 1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor B Circuit Low Voltage	P127C	Determine when a short circuit to ground affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.3 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 ≥ 15 s > 8.4 V	38 failures out of 55 samples OR 22 continuous failures out of 55 samples 6.25 ms/samples	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage Low	P129B	Detects low voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage drops below a calibrated value.	Fuel Pump Driver Control Module System Voltage Low	Fuel Tank Zone Module (FTZM) Battery Voltage <= 10.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Starter motor not engaged Sensor Bus relay is commanded ON	 = 1	6 failures out of 6 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage High	P129C	Detects high voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage exceeds a calibrated value.	Fuel Pump Driver Control Module System Voltage High	Fuel Tank Zone Module (FTZM) Battery Voltage >= 16.00	Fuel Tank Zone Module (FTZM) is present on vehicle		6 failures out of 6 samples 12.5 ms / sample	Type B, 2 Trips
					Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled	= 1		
					Fuel Tank Zone Module (FTZM) serial messages are available			
					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 System Ignition Switch Run/ Start Position Circuit Low (Only on applications that use an FTZM)	P129D	Detects low voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage is below a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit low	FTZM Run Crank Active is FALSE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = TRUE	72 failures out of 80 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P129F	FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed	Sensed Filtered Fuel Pump Speed Error	> 1,150.00 revs/min OR < -1,150.00 revs/min	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	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
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	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
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]	>= 500.00 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	> 1.00 [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	> -7.00 [°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	> 750.00 [rpm] AND < 2,400.00 [rpm]		
					Desired fuel quantity in range	> 5.00 [mm^3] AND < 80.00 [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 260.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> -250.00 [mg/s] AND < -1.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	< 0 [mg]		
					EGR valve position OR it is above that threshold for a time	<= 75.00 [%] >= 1.00 [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]	>= 500.00 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	> 1.00 [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	> -7.00 [°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	> 1,000.00 [rpm] AND < 1,900.00 [rpm]		
					Desired fuel quantity in range	> 22.00 [mm^3] AND < 53.00 [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 260.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> 1.00 [mg/s] AND < 250.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	> 0 [mg]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor A Reference Feedback Range/ Performance [use with FTZM device]	P1434	Fuel level sensor(s) for some vehicle applications may be connected to a Fuel Tank Zone Module (FTZM) that is located in close proximity to the fuel tank, instead of being wired directly to the engine control module (ECM). This diagnostic detects errors in sensed reference voltage signal pulse width compared to the ECM commanded value and sensed reference voltage period compared to the ECM commanded value for the primary fuel tank sensor. The FTZM measures the period and pulse width of the reference voltage signal supplied to each fuel level sensor and transmits the measurements to the ECM via serial data for a pass/fail determination. The FTZM conforms to OBD2 "smart" device rules and, as such, the ECM serves as the diagnostic host for it. To reduce overall power consumption, and to minimize the	Reference Voltage Signal Period Error [Commanded - Measured]	> 25.00 millisec	a] CAN Sensor Bus Message $2D7 Available b] Reference Voltage Period Availability Delay Timer c] Reference Voltage Pulse Width Available Synchronization Timer [IF ECM SUPPLIED] d] Diagnostic System Disabled e] CAN Sensor Bus Message $2D7 Fuel Level Sensor2 Signal Message Counter Incorrect [CFMR_b_FTZM_Info4_ARC_ChkErr] f] Reference Voltage Performance Diagnostic Enabled	a] == TRUE b] > 0.75 seconds c] > 1.25 seconds d] <> TRUE e] <> TRUE f] == TRUE	16.00 failures / 20.00 samples 250 millisec / sample	Type B, 2 Trips
			Reference Voltage Signal Pulse Width Error [Commanded - Measured]	> 1.50 millisec	a] CAN Sensor Bus Message $2D7 Available b] Reference Voltage Period Availability Delay Timer c] Reference Voltage Pulse Width Available Synchronization Timer [IF ECM SUPPLIED] d] Diagnostic System Disabled	a] == TRUE b] > 0.75 seconds c] > 1.25 seconds d] <> TRUE	16.00 failures / 20.00 samples 250 millisec / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		corrosion of electrical contacts exposed to hostile fuels such as ethanol, the FTZM pulse width modulates the reference voltage supplied to the primary and secondary (if applicable) fuel level sensors. The period for both fuel level sensor PWM reference voltage signals is determined from a single calibration resident within the FTZM, and the pulse width for both fuel level sensor PWM reference voltage signals is determined from either a single calibration resident within the FTZM, or from an ECM command that is transmitted to the FTZM via serial data. Transmission of the period and pulse width measurements from the FTZM to the ECM is event-triggered in response to the falling edge of the command for the reference voltage pulse [in case of dual fuel tanks, falling edge of the secondary tank sensor pulse is used to trigger data transmission], and			e] CAN Sensor Bus Message $2D7 Fuel Level Sensor2 Signal Message Counter Incorrect [CFMR_b_FTZM_Info4_ARC_ChkErr] f] Reference Voltage Performance Diagnostic Enabled	e] <> TRUE f] == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		occurs every 250 ms. To expedite the availability of fuel level information at FTZM power-up, the first transmission of data may occur before a full period measurement is available. The fuel level sensor reference voltage performance diagnostics resident in the ECM employ an ‘X of Y’ strategy for making pass and fail determinations. If the fault counter accumulates X counts (the diagnostic failure threshold) before the diagnostic test completes (i.e. before the sample counter accumulates Y counts), then the diagnostic reports a test failure. If the test completes without accumulating X fault counts, then the diagnostic reports a test pass.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undertermin ed	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 MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Feedback Circuit High Voltage	P157A	This DTC checks that the Sensor Bus Relay output is not stuck high	The Sensor Bus Relay ouput is stuck high	>= KeSBRR_Cnt_SB_RlyStkHiFailThrsh within KeSBRR_Cnt_SB_RlyStkHiSmplThrsh samples	The Sensor Bus Relay output has been inactive	>= KeSBRR_t_SB_RelayCommandedOff		Type B, 2 Trips

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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 MIL, Special Type C

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 MIL, Special Type C

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 the FTZM Sensor Reference Voltage Status 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	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
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	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
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.
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 signal and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low).

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit High	P16D9	This DTC checks that the Sensor Bus Relay output is not shorted to power	The Sensor Bus Relay output circuit is shorted to power	>= KeSBRD_Cnt_RlyPsht Fail within KeSBRD_Cnt_RlyPsht Smpl samples	The Sensor Bus Relay Commanded Output state	= On		Type 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	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.	Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 2,500.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 2,500.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 20 counts; 25.0msec/count	
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 190.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is	189.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 163	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	190.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Speed Lores	N/A		Engine speed greater	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Intake Firing (event based) calculation not equal its redundant calculation			than 0rpm	163 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 163 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	**P16F3_Speed Control External Load f(Oil Temp, RPM)** + 190.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	**P16F3_Speed Control External Load f(Oil Temp, RPM)** +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				190.00 Nm			multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Commanded Immediate Request is less than its redundant calculation minus threshold					
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	312.50 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired engine torque request greater than redundant calculation plus threshold	189.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	550.50 m/s	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 163 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Request and its dual store do not match				ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 213 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 190.00 Nm Low Threshold - 190.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or	High Threshold 35.00	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			less than threshold limit	Nm Low Threshold 0.00 Nm			0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 190.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Torque Closed Loop Fuel Quantity Correction higher then threshold OR Engine Torque Closed Loop Fuel Quantity Correction lower then threshold	9.36 mm3 - 9.36 mm3	Engine cranking or engine running		Up/down timer 463 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	1. 189.00 Nm 2. N/A 3. 189.00 Nm 4. 189.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 190.00 Nm 3. & 4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 190.00	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	312.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	3,750.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	3 / 6 counts; 25.0msec/count	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multipier	
			Requested fuel mass is greater or equal to its redundant calculation plus threshold	15.86 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Engine friction torque is greater than its redundant calculation plus threshold OR Engine friction torque is lower than its redundant calculation minus threshold	190.00 Nm 190.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			High Pressure Pump Torque Load is greater than threshold OR High Pressure Pump Torque Load is lower than threshold	190.00 Nm 0.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Pumping Losses is lower than threshold OR Pumping Losses rate of change signal greater than P2D2 threshold	0.00 Nm 11.88 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Start Up Engine Friction Compensation greater than threshold	190.00 Nm	Engine running		Up/down timer 87.50 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Start Up Engine Friction Compensation lower than threshold	 0.00 Nm			0.5 down time multiplier	
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	190.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Active damping torque reduction greater than threshold OR Active damping torque reduction lower than threshold	190.00 Nm -190.00 Nm	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Fuel volume request greater than its redundant calculation plus threshold	18.71 mm3	Engine running No rich combustion mode		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the sum of the Fuel Volumes in the pulse train minus Fuel Volume Request minus Main Correction greater than threshold	18.71 mm3	Engine Running No rich combustion mode Main pulse quantity already compensated with main correction is greater than or equal to zero		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Cumulative Programmed Energizing Time greater then its redundant	199.25 us	Engine running		Up/down timer 162.50 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	 additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us			0.5 down time multiplier	
			Cumulative Desired Energizing Time greater than its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	199.25 us additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us	Engine Running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal higher than threshold OR Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal lower than threshold	300.00 MPa -40.00 MPa	Engine running Delta Filtered Pressure value lower than AND Delta Filtered Pressure value greater than	 1,880.25 MPa/s -3,582.25 MPa/s	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute difference between Main Correction and its redundant calculation greater than or	18.71 mm3	Engine running No rich combustion mode		Up/down timer 162.50 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			equal to threshold				down time multiplier	
			Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than its redundant calculation plus threshold OR (only if cylinder balancing detected a fault) Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than threshold	**P16F3_CB safety deadband threshold f (Fuel Rail Pressure)** us **P16F3_CB safety deadband threshold f (Fuel Rail Pressure)** us	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	**P16F3_EIA safety deadband threshold f (Fuel Rail Pressure)** us	Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	18.71 mm3	Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the weighted delta energizing time greater then threshold	**P16F3_SQA safety deadband threshold f (Fuel Rail Pressure)** us	Ignition State	Accessory, run or crank	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Oil Pump Low Pressure Offset Friction greater then zero		Engine running		Up/down timer 475.00 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Oil Pump Low Pressure Offset Friction lower then threshold	-3.00 Nm			0.5 down time multiplier	
			Absolute value of fuel mass compensated for coolant temperature greater then threshold	7.93 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of fuel mass compensated for air temperature greater then threshold	7.93 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Difference between Energizing Time Compensation for Temperature Specific Current (TSC) and its redundant calculation greater then threshold	**P16F3_TSC safety deadband threshold f (Fuel Rail Pressure)** us	Engine Running AND Engine State is Syncronous		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of Main correction compensation based on coolant temperature greater then threshold	9.36 mm3	Engine Running No rich combustion mode		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Rail Pressure Wave Compensation greater than threshold	**P16F3_Rail Pressure Wave Compensation f(Fuel Rail Pressure, Fuel Quantity)** MPa	Engine cranking or running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Injector Valve Closing Adjustment energizing time correction greater then threshold OR Injector Valve Closing Adjustment energizing time correction lower then threshold	**P16F3_VCA safety max deadband threshold f(Fuel Rail Pressure)** us **P16F3_VCA safety min deadband threshold f(Fuel Rail Pressure)** us	Engine Cranking or engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	190.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Fuel Temperature Energizing Time Compensation greater then its redundant calculation plus threshold	**P16F3_FTD safety deadband threshold f (Fuel Rail Pressure)** us	(Engine running OR engine cranking occurred in current driving cycle) AND FUL_InjLeakTempValid	 = TRUE	Up/down timer 87.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the diffence between current and previous Fuel Injector Backflow Temperature greater then threshold	10.00 °C/100ms	Engine cranking or engine running ECT_Sensor_FA AND	 = FALSE	Up/down timer 87.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					FTS_FTS_CktFA AND FTS_FTS_PlFA AND XOY_SecurityFlt_CeXOYR_e_FULR_FTD_RateLimFlt AND XOY_SecurityFlt_CeXOYR_e_ETMR_FTD_RedntCalcFlt	= FALSE = FALSE = FALSE = FALSE		
			Increase of pumping losses due to exhaust brake actuation less then threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Exhaust Brake Torque Capacity less then Threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Delta Engine Fuel Temperature less than zero		Engine Fuel Temperature below threshold Engine cranking or engine running	80.00 ° C	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Combustion Mode		Engine cranking or engine		Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Arbitration Winner is higher than the maximum expected combustion mode OR Previous Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Combustion Mode Arbitration Winner is equal to Previous Combustion Mode Arbitration Winner and not equal to Normal combustion Mode		running		162.50 ms continuous, 0.5 down time multiplier	
			The sum of Low, Middle and High Barometric Correction Factors greater than 1		Engine cranking or engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			DPF Automatic or Service Regeneration process active when not expected.		Engine cranking AND DMAX Engine AND Vehicle Speed < -1.00 Kph for period of time >		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P16F3_DPF Max Regeneration Time f (RPM) secs			
			Outgoing combustion mode trasition from a DPF Regeneration mode take too long time.	transiiton duraiton > 500.00 secs	Engine cranking AND DMAX Engine AND Vehicle Speed < -1.00 Kph for period of time > **P16F3_DPF Max Regeneration Time f (RPM)** secs		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	
			HCI injector driven, when out of DPF combustion mode, whit duty-cycle profile higher (in authority and time duration) then HCI Tip-Cleaning process.	HCI commanded Duty Cycle > 100.00 % AND [HCI commanded Duty Cycle OUT of range 50.00 % +- 50.00 % OR HCI commanded Duty Cycle IN range 50.00 % +- 50.00 % for time duration > 500.00 secs]	Engine cranking AND DMAX Engine AND [Previous Combustion Mode is not a DPF_Regen one, OR Outgoing Combustion Mode transition from a DPF regenraion mode completed]		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Mode Switch Signal Circuit Include for programs that are NOT hybrid start stop conventional	P1762	BCM to ECM Rolling Count check for CAN frame $1E1. -- Only utilize when calibration variable KeINFG_e_HybridType does not equal CeINFR_e_StartStopConv. (Note: Not Equal To is represented by <>)	Rolling count value received from BCM does not match expected value	= TRUE	Engine Speed Engine Speed Engine speed between min/max for Vehicle Speed for Hybrid type	≥ 200 RPM ≤ 7,500 RPM ≥ 5.0 seconds ≤ 318.14 MPH ≥ 5.0 seconds <>CeINFR_e_StartStopConv	> 3 error counts for > 10.0 seconds 100 ms / sample	Type C, No MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Performance	P206B	This diagnosis checks if the DEF Quality Sensor has performance problems	The Quality sensor ready flag is provided to the ECM by the DEF-C via CAN bus. This monitor checks if the reflected sound waves are not heard by the sensor (for example, if the sensor is contaminated).	Quality sensor ready flag status equals to FALSE	Run/Crank is Active	TRUE	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					Engine in Cranking Phase	FALSE		
					No loss of CAN communication	CAN_LostComm_FltN_BusB_DEF_C == FALSE		
					No fault messages from the DEF-C Controller	TRUE		
					DEF Level Estimation	> 5.00 l		
					DEF QS thermistor temperature	> -4.00 °C		
					No electrical fault on DEF QS is present	DQMR_DEFQS_ElecFlt == FALSE		
					No electrical low fault on DEF Quality Sensor SENT circuit	DQMR_DEFQS_SENT_ElecFA == FALSE		
					No performance fault on DEF Quality Sensor SENT circuit	DQMR_DEFQS_SENT_PerfFA == FALSE		
					No fault on DEF QS thermistor is present	DQMR_DEFQS_TempFlt == FALSE		
					No electrical fault on Quality sensor PZT is present	DQMR_DEFQS_PZT_ElecFlt == FALSE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SCR NOx Catalyst Efficiency Below Threshold Bank 1	P20EE	This diagnosis checks if there is a malfunctioning in the SCR conversion system through its SCR NOx Conversion Efficiency. SCR conversion efficiency is evalueted by two NOx Sensors (Upstrem & Downstrem SCR). Monitoring is executed by compararing a mesured NOx efficiency and expected conversion efficiency: - Measured Efficiency is calculated as η_Eff_Msrd = 1 - [∫ NOx_Dwn_Msrd / ∫ NOx_Up_Msrd] - Expected Efficiency is evalueted as η_Eff_Ref = 1 - [∫ NOx_Dwn_Ref / ∫ NOx_Up_Msrd]	- If EWMA feature is not enable (1 == 0 [Boolean]), SCR measured NOx conversion efficiency (η_Eff_Msrd) lower than expected one (η_Eff_Ref) - If EWMA feature is enable (1 == 1 [Boolean]), EWMA filtering is apply to the difference between SCR measured NOx conversion efficiency (η_Eff_Msrd) and expected one(η_Eff_Ref)	- If EWMA filter is not enable (1 == 0 [Boolean]) --> η_Eff_Ref - If EWMA filter is enable (1 == 1 [Boolean]) --> Fail Threshold is = 0, Repass Threshold is = 0	Test enabled by calibration; No active DTCs; Debounce time has to be elapsed after SCR Chemical Model is healed; Debounce time has to be elapsed after exiting from Transient Dosing forced by Remedial Action (conditions active only if Market ≠ USA_CARB) Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is enabled and in Rapid Response (RR) or Fast Initial Response (FIR) status;	CalOut = 1 [Boolean]; ≠ NOX_Snsr1_NOx_Flt ≠ NOX_NOx_SnsrSCR_DwnFlt ≠ EGT_TempSCR_UpFlt ≠ EGP_PresSCR_UpFlt ≠ EXM_TurbFlowNotValid ≠ SCR_RDP_Flt ≠ SCR_TipStuckFltSt ≠ SCR_ChemicalMdlFlt; Debounce = 300 [sec]; Debounce = 300 [sec]; NotDsbl = True [Boolean]; NotRun = True [Boolean];	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.
					Test per trip up to calibrateable value when EWMA filter is active and in Fast Initail Response (FIR) status;	FIR Test Trip < 2 ;		
					Total Test executed in Rapid Response Fast Initail Response (FIR) up to calibrateable value when EWMA filtering is active	FIR Tot Test < 2 ;		
					Test per trip up to calibrateable value when EWMA filter is active and in Rapid Response (RR) status;	RR Test Trip < 6 ;		
					Total Test executed in Rapid Response (RR) up to calibrateable value when EWMA filtering is active;	RR Tot Test < 6 ;		
					DEF system ready to inject;	DEF Ready = True [Boolean];		
					Urea inside the Tank not frozen;	DEF Tank Status = DEF_TankNotFrozen [Enumerative];		
					Debounce time has to be elapsed after DEF Defrost has been complited ;	Debounce = 300 [sec];		
					Engine Torque request higher than calibration;	Torque >= 0 [Nm];		
					Upstream SCR NOx Sensor measurement	Reliable = True [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					reliable;			
					Downstream SCR NOx Sensor measurement reliable;	Reliable = True [Boolean];		
					Slip detection reliable;	Slip Reliable = True [Boolean];		
					Number of successfully completed DPF regeneration events has occurred after vehicle exit from assembly plant (SCR Catalyst De-Greened);	DPF Rgn Compt > 0 [-];		
					SCR Service Bay Test not active;	Service Bay Test == ServNotRunning [Enumerative];		
					Debounce time has to be elapsed after exiting from SCR Service Bay Test;	Debounce = 300 [sec];		
					Outside Ambient Temperature higher than calibration with hysteresis;	OAT > -7 [°C]; -7 [°C] < hysteresis range < -7 [°C]		
					Ambient Pressure higher than calibration with hysteresis;	Pressure > 70 [kPa]; 70 [°C] < hysteresis range < 70 [°C]		
					Urea Dosing activation by SCR mean temperature condition;	SCR mean Temperature > 190 [°C]; 180 [°C] < hysteresis range < 190 [°C]		
					Debounce time has been elapsed after Urea Dosing activation by SCR mean temperature	Debounce = 180 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					becomes true; Difference between SCR upstream and SCR downstream temperatures has to be: - higher than first calibration curve (f[SCR mean Temperature]) AND - lower than second calibration curve (f[SCR mean Temperature]); Debounce time has to be elapsed when difference between SCR upstream and SCR downstream temperatures condition becomes in range Exhaust mass flow and SCR average temperature shall be within calibrateable region defined by 2 size table (f [Exhaust mass flow, SCR average Temperature]), enablement occur if table output is greater than calibration; Debounce time has to be elapsed when exhaust mass flow and SCR average temperature condition becomes in range;	SCR Up/Down Diff Temperature > **T_MinTempGrad** [°C] Temperature < **T_MaxTempGrad** [°C]; Debounce = 5 [sec]; **K_EffExhFlowCond** > 1 [-]; Debounce = 3 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR mean Temperature time derivative is inside a region defined by maximum and minimum calibrations and debounce time has been elapsed base on following logic: - while SCR mean Temperature time derivative is out of the region, the system continuously evaluete the debounce time base on calibration curve (f[SCR mean Temperature time derivative]) and record the maximum value; - instead when SCR mean Temperature time derivative enter inside region, countdown start until debounce time has been reached;	-5 < Delta Temperature < 5 [°C/sec]; Debounce = **t_DerTempDsblTmr** [sec];		
					Upstream SCR NOx flow measurement lower than calibration and debounce time has been elapsed base on following logic: - while SCR NOx flow measurement higher than calibration, the system continuously evaluete the NOx avarage flow; - instead when SCR NOx flow measurement becomes lower than calibration, debounce time base on calibration curve	NOx Up Flow < 200 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max Debounce = 5 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(f[NOx avarage flow, time spent with NOx flow higher than calibration]) is evalueted and countdown start until debounce time has been elapsed. Limitation on the debouce time is always applied; Upstream SCR NOx flow measurement higher than calibration; Upstream SCR NOx Sensor measurement higher than calibration; Upstream SCR NOx Sensor measurement lower than calibration; Downstream SCR NOx Sensor measurement higher than calibration; Upstream SCR NOx flow measurement lower than calibration; Upstream SCR absolute NOx derivative flow lower than calibration; NO2/NO ratio shall be: - higher than first calibrateable value AND - lower than second calibrateable value; Debounce time has to be elapsed when all NOx	NOx Up Flow > 4 [mg/s]; NOx Up > 85 [ppm]; NOx Up < 500 [ppm]; NOx Dwn > -1 [ppm]; NOx Up Flow < 200 [mg/s]; Delta NOx Up Flow < 35 [mg/sec^2]; NO2/NO > 0 [-] NO2/NO < 1 [-];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					conditions (except Upstream SCR NOx flow measurement lower than calibration) becomes true; Slip conditions: - debounce time has to be elapsed when slip goes off, OR - when slip is active NOx Upstream flow accumulated shall be greater than a calibration curve (f[SCR Temperature]); No DPF / DeHC combustion modes has to be active; Debounce time has to be elapsed after exiting from a DPF / DeHC combustion modes; NH3 storage deviation error has to be: - higher than first calibration curve (f[SCR Average Temperature]) AND - lower than second calibration curve (f[SCR Average Temperature]);	Debounce = 5 [sec]; Debounce = 5 [sec] ∫ NOx_Up > **m_SlipNOxIntglThrsh** [mg]; Cmb ≠ DPF_HiO2 | DPF_LoO2 | DPF_EngPrtct_HiO2 | DPF_EngPrtct_LoO2 | DPF_PN | DPF_RichIdle | DeHC_Drive | DeHC_Park [Enumerative]; Debounce = 300 [sec]; NH3 Deviation > **m_NH3_StrgDevErrMinThrsh** [g] NH3 Deviation <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NH3 storage has to be: - higher than first calibration curve (f[SCR Average Temperature]) AND - lower than second calibration curve (f[SCR Average Temperature]); Debounce time has been elapsed when NH3 storage deviation error or NH3 storage conditions becomes in range; SCR Dosing in NH3 Storage Control or in Intrusive NH3 Storage Control; Debounce time has to be counted after entering on NH3 Storage Control; Diesel Exhaust Fluid Quality mesurement (concentration read by DEF Quality Sensor) higher than calibration with hysteresis (conditions active only if DEF Quality Sensor is available);	**m_NH3_StrgDevErrMaxThrsh** [g]; NH3 Storage > **m_NH3_StrgMinThrsh** [g] NH3 Storage < **m_NH3_StrgMaxThrsh** [g]; Debounce = 3 [sec]; Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 0 [sec]; DEF Concentration > 27 [Pct]; 23 [Pct] < hysteresis range < 27 [Pct] DEFQS Present= 1 [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref	< 0.4625 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 percent Vref >	4.7500 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #2 on the Main processor.	APP2 percent Vref <	0.3250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor.	APP2 percent Vref >	2.6000 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects when the Intake Air Temperature (IAT) sensor and IAT2 sensor values do not correlate with each other. These two temperature sensors are both in the induction system, although they do have different sensor time constants and different positional relationships with components that produce heat. If these two temperature values differ by a large enough amount, the Intake Air Temperature 1 / 2 Correlation Diagnostic will fail. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (US Market - 3 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	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (Diesel, pull-down)	P2228	Detects a continuous short to ground or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 35.5 % of 5 Volt Range (This is equal to 50.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor 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	> 95.0 % of 5 Volt Range (This is equal to 116.1 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 (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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Boost System A Performance (OBDII market only)	P2263	This monitor is used to detect any malfunction in the boost pressure control system causing very high or low intake manifold pressure that could lead to overspeed the turbine. It works only in steady state closed loop pressure control zone, tipically in the turbine overspeed area outside of the FTP test cycle. The DTC checks a positive or negative control deviation of the boost pressure indicating an underboost or overboost condition. The aim of the boost pressure system performance monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold (underboost) or obstructions in the exhaust pipe (overboost) that lead to overspeed the turbine.	Boost pressure tracking error: difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): < (**P2263: Boost pressure system performance negative error threshold (throttle control active)** [kPa] x **P0234, P2263: Overboost barometric correction**) OR > (**P2263: Boost pressure system performance positive error threshold (throttle control active)** [kPa] x **P0299, P2263: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old (Engine Coolant Temperature	1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -7.00 [°C] AND < 55.00 [°C] > -2 [kPa/s] AND < 3 [kPa/s] > 70 [°C]	400.00 fail counters over 500.00 sample counters sampling time is 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				flags" Free Form): < (**P2263: Boost pressure system performance negative error threshold (throttle control not active)** [kPa] x **P0234, P2263: Overboost barometric correction**) OR > (**P2263: Boost pressure system performance positive error threshold (throttle control not active)** [kPa] x **P0299, P2263: Underboost barometric correction**)	OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature Ambient Air Pressure in range Throttle Valve position Engine speed in range Desired intake Boost pressure in range No active DTCs All enabling conditions last for a time	==TRUE < 130 [°C] > 70 [kPa] AND < 110 [kPa] >= 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) > 560.00 [rpm] AND < 3,100.00 [rpm] > 70.00 [kPa] AND < 320.00 [kPa] AIC_BstSysDiagDenomDsbl ==FALSE >		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Water in Fuel Sensor Circuit (Analog/ Active, Wired to FTZM)	P2264	Monitor verifies that sensor output voltage is within expected range.	Water In Fuel sensor output (as percentage of supply voltage)	≥ 95 %	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 > 0.0 s > 360.00 s ≥ 11.0 V P1103 SBR_RlyFA	10 failure out of 14 samples 100 ms/sample	Type C, No MIL, Special Type C

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 (US Market - 3 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	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor Circuit C Low (Diesel, pull-up)	P227C	Detects a continuous short to ground in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	< 34.5 % of 5 Volt Range (This is equal to 43.9 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 (OBD2)	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 (OBD2)	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 (OBD2)	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 (**P228C P228D Low fuel level calibrated as enabling condition (MU)** AND LowFuelConditionDiagnostic (**P228C P228D Air ambient pressure calibrated as enabling condition (MU)** AND Air ambient pressure (**P228C P228D Air ambient temperature calibrated as enabling condition (MU)** AND Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 15.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -7 °C) P000F	640 failures out of 800 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	> 16 to 16 MPa (see table	Run crank voltage Engine running Pressure Regulator	≥ 11.0 V	640 failures out of 800 samples 12.5 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P229A Positive rail pressure deviation (PR))	controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (**P229A P229B Low fuel level calibrated as enabling condition (PR)** AND LowFuelConditionDiagnostic (**P229A P229B Air ambient pressure calibrated as enabling condition (PR)** AND Air ambient pressure (**P229A P229B Air ambient temperature calibrated as enabling condition (PR)** AND Air ambient temperature	 > 15.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -7 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High (OBD2)	P228D	Determine when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< -16 to -16 MPa (see table **P228D Negative rail pressure deviation (MU)**	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity Fuel temperature (**P228C P228D Low fuel level calibrated as enabling condition (MU)** AND LowFuelConditionDiagnostic (**P228C P228D Air ambient pressure calibrated as enabling condition (MU)** AND Air ambient pressure (**P228C P228D Air ambient temperature calibrated as enabling condition (MU)** AND Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 15.0 mm^3/stroke > -40 °C = FALSE) ≥ 60 kPa) ≥ -7 °C) P000F	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	< -16 MPa	Run crank voltage Engine running	≥ 11.0 V	640 failures out of 800 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Pressure Regulator controlled in closed loop (refer to RailPresCntrl) Fuel injected quantity **P229A P229B Low fuel level calibrated as (enabling condition (PR)** AND LowFuelConditionDiagnostic (**P229A P229B Air ambient pressure calibrated as enabling condition (PR)** AND Air ambient pressure (**P229A P229B Air ambient temperature calibrated as enabling condition (PR)** AND Air ambient temperature	 > 15.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -7 °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.
Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249D	This diagnosis checks if the DEF injection system has exceeded limit of correction authority Monitoring is executed by compararing Long Term Adaptation Factor (LTAF) with a calibratable threshold: LTAF > OBD High Threshold The longterm adaptation factor is created based on the information given by the NH3 storage correction strategy, this factor represents the deviation of the complete SCR system measured and shall be used to compensate it by making a correction over the DEF injection quantity	Long Term Adaptation Factor (LTAF) higher than calibrateable Threshold	LTAF > 1.69	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 limit of correction authority Monitoring is executed by compararing Long Term Adaptation Factor (LTAF) with a calibratable threshold: LTAF < OBD Low Threshold The longterm adaptation factor is created based on the information given by the NH3 storage correction strategy, this factor represents the deviation of the complete SCR system measured and shall be used to compensate it by making a correction over the DEF injection quantity	Long Term Adaptation Factor (LTAF) lower than calibrateable 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.
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 >= 3 range errors out of 10 samples. Performed on every received message >= 5 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump "A" Low Flow / Performance	P2635	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	<= Low Threshold [Supporting Table] **P2635 Threshold Low** OR >= High Threshold [Supporting Table] **P2635 Threshold High**	a) Diagnostic enabled [FDBR_b_FSRD] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [HCIR_b_GshtFA DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds [FDBR_b_UseCalcFSRD_FltThrshs] c8) Engine Speed Status Valid c9) FAB_FuelPmpCktFA c10) Fuel Control Enable	a) == TRUE b) >= 40.00 seconds c1) == TRUE c2) <> TRUE c3) <> TRUE c4) <> TRUE c5) <> TRUE c6) <> TRUE c7) <> TRUE c8] == TRUE c9] <> TRUE c10) <> TRUE	1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fault Active [DTC P12A6]			
					c11) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c11) <> TRUE		
					c12) Fuel Pump Speed Fault Active [DTC P129F]	c12) <> TRUE		
					c13) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_Info1_UcodeCmFA DTC P165C]	c13) <> TRUE		
					c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	c14] <> TRUE		
					c15) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c15) == CeFDBR_e_WiredTo_ECM		
					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_ARC_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.
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 signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controllers P0650 may also set (MIL Control Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	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 signal and controller power	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

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

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, No MIL, Special Type C

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 MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Four Wheel Drive Low Switch Circuit	P2771	The 4WD low switch is used to indicate 4WD high or 4WD low as requested by the vehicle driver. Fail case 1: continuous open in which the 4WD low switch circuit indicates 4WD high ratio, not in 4WD low ratio, but the measured transfer case ratio is 4WD low ratio. Fail case 2: continuous ground short in which the 4WD low switch circuit indicates 4WD low ratio, not in 4WD high ratio, but the measured transfer case ratio is 4WD high ratio. 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.	fail case 1: 4WD low switch raw value transfer case measured gear ratio, update fail time 1 OR fail case 2: 4WD low switch raw value transfer case measured gear ratio, update fail time 2	= FALSE ≥ 2.500 and ≤ 2.750 = TRUE ≥ 0.950 and ≤ 1.050	diagnostic monitor enable engine torque engine torque engine speed engine speed ignition voltage (controller run crank ignition in range) throttle position without idle throttle position without idle transmission fluid temperature transmission fluid temperature engine run time vehicle speed transmission gear (auto trans) clutch pedal position (manual trans) DTCs not fault active	= 0 Boolean ≥ 90.0 Nm ≤ 8,191.8 Nm ≥ 1,000 RPM ≤ 5,500 RPM ≥ 11.00 volts ≥ 3.0 % ≤ 99.0 % ≥ -40.0 ºC ≤ 130.0 ºC ≥ 10.0 seconds ≥ 5.00 MPH = forward drive gear ≤ 68.0 % TPS_FA EngineTorqueEstInaccurate P0502, P0503, P0716, P0717, P07BF, P07C0 P0722, P0723, P215B, P215C, P2160, P2161, U0101	fail time 1 ≥ 2.0 seconds, increment fail count 1, fail count 1 ≥ 2 counts fail time 2 ≥ 7.0 seconds, increment fail 2 count, fail 2 count ≥ 2 counts fail time an fail count 100 milliseond update rate	Type B, 2 Trips

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Erratic Temperature	P2ADD	This diagnosis verify if the DEF Quality Temperature Sensor signal dynamic is plausible.	This monitor checks if the dynamic behaviour of the DEF Quality Sensor signal is out of calibratable thresholds.		Powertrain relay voltage	> 11.00 V	Time counter: 40.00 fails out of 50.00 samples Task = 100ms	Type A, 1 Trips
					Run/Crank is Active	TRUE		
					Engine in Cranking Phase	FALSE		
			QS thermistor raw value OR	> (1-α) * 155.00 °C + (Last good sample * α)	No electrical fault on DEF QS thermistor is present	DQMR_DEFQS_PZT_ElecFlt == FALSE		
			QS thermistor raw value	< (1-α) * -55.00 °C + (Last good sample * α)	No loss of CAN communication	CAN_LostComm_FltN_BusB_DEF_C == FALSE		
				with: α = e^[-(amount of consecutive bad samples * 0.08)]	DEF-C Controller not in initialization condition	TRUE		
					No electrical fault on DEF QS is present	DQMR_DEFQS_ElecFlt == FALSE		
					No electrical fault on DEF Quality Sensor SENT circuit	DQMR_DEFQS_SENT_ElecFA == FALSE		
					No performance fault on DEF Quality Sensor SENT circuit	DQMR_DEFQS_SENT_PerfFA == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0076 Normal CAN transmission on Bus S Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					U0073	Not Active on Current Key Cycle		
			Message $0BD	≥ 10.0 seconds	Normal CAN transmission on Bus A	Enabled		
			Message $0C7	≥ 10.0 seconds	Device Control	Not Active		
			Message $0F9	≥ 10.0 seconds	High Voltage Virtual Network Management	Not Active		
			Message $189	≥ 10.0 seconds	Ignition Voltage Criteria:			
			Message $199	≥ 10.0 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
			Message $19D	≥ 10.0 seconds	Power Mode	= run		
			Message $1AF	≥ 10.0 seconds	Off Cycle Enable Criteria:			
			Message $1F5	≥ 10.0 seconds	KeCAND_b_OffKeyCycleDiagEnbl	= 0 (1 indicates enabled)		
			Message $4C9	≥ 10.0 seconds	Ignition Accessory Line and	= Active		
					Battery Voltage	> 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U0101	Not Active on Current Key Cycle		
					TCM	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With 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	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U0102	Not Active on Current Key Cycle		
					TCCM	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Glow Plug Control Module 1	U0106	This DTC monitors for a loss of communication with the Glow Plug Control Module 1	Message is not received from controller for Message $3BD	≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U0106	Not Active on Current Key Cycle		
					Glow Plug Control Module 1	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with 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 Message $099 Message $499	 ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0076 Normal CAN transmission on Bus C (Sensor Bus) Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U010C	Not Active on Current Key Cycle		
					Turbocharger Boost Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Reductant Control Module (SCR)	U010E	This DTC monitors for a loss of communication with the Reductant Control Module (SCR)	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					U0074	Not Active on Current Key Cycle		
			Message $092	≥ 10.00 seconds	Normal CAN transmission on Bus B	Enabled		
			Message $4CC	≥ 10.00 seconds				
			Message $4CD	≥ 10.00 seconds	Device Control	Not Active		
			Message $4E5	≥ 10.00 seconds	High Voltage Virtual Network Management	Not Active		
			Message $4E6	≥ 10.00 seconds	Ignition Voltage Criteria:			
			Message $4E7	≥ 10.00 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
			Message $4E8	≥ 10.00 seconds				
			Message $4E9	≥ 10.00 seconds	Power Mode	= run		
					Off Cycle Enable Criteria:			
					KeCAND_b_OffKeyCycleDiagEnbl	= 0 (1 indicates enabled)		
					Ignition Accessory Line and	= Active		
					Battery Voltage	> 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U010E	Not Active on Current Key Cycle		
					Reductant Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With 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 $1C7 Message $1E9 Message $2F1 Message $2F9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0121 Anti-Lock Brake System Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With 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 "Special Type C"
					U0073	Not Active on Current Key Cycle		
			Message $0F1	≥ 10.0 seconds				
			Message $12A	≥ 10.0 seconds	Normal CAN transmission on Bus A	Enabled		
			Message $1E1	≥ 10.0 seconds	Device Control	Not Active		
			Message $1F1	≥ 10.0 seconds	High Voltage Virtual Network Management	Not Active		
			Message $1F3	≥ 10.0 seconds	Ignition Voltage Criteria:			
			Message $3C9	≥ 10.0 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
			Message $3CB	≥ 10.0 seconds				
			Message $3F1	≥ 10.0 seconds	Power Mode	= run		
			Message $451	≥ 10.0 seconds	Off Cycle Enable Criteria:			
			Message $4D7	≥ 10.0 seconds	KeCAND_b_OffKeyCycleDiagEnbl	= 0 (1 indicates enabled)		
			Message $4E1	≥ 10.0 seconds				
			Message $4E9	≥ 10.0 seconds	Ignition Accessory Line and Battery Voltage	= Active > 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	> 0.4000 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0140 Body Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With NOx Sensor A	U029D	This DTC monitors for a loss of communication with the NOx Sensor A	Message is not received from controller for Message $0B0 Message $0B1 Message $0B5 Message $0B7 Message $289 Message $293 Message $591	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U029D	Not Active on Current Key Cycle		
					NOx Sensor A	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With NOx Sensor B (post catalyst NOx sensor)	U029E	This DTC monitors for a loss of communication with the NOx Sensor B	Message is not received from controller for Message $0A4 Message $0B2 Message $0B6 Message $0B8 Message $28B Message $294 Message $592	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U029E	Not Active on Current Key Cycle		
					NOx Sensor B	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With PM Sensor (Diesel Particulate)	U02A3	This DTC monitors for a loss of communication with the PM Sensor (Diesel Particulate)	Message is not received from controller for Message $3A3 Message $3A5 Message $3A7 Message $3A9 Message $3AB Message $497	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U02A3	Not Active on Current Key Cycle		
					PM Sensor (Diesel Particulate)	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Driver Control Module	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 Message $0D5 Message $0D7	 ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) =Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U18A2	Not Active on Current Key Cycle		
					Fuel Pump Driver Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 2 Low Voltage - (GEN III Controllers ONLY)	P16AF	Detects low voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 2 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, No MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage - (GEN III Controllers ONLY)	P16B3	Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >= 4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 MIL, Special Type C

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.
Fuel Pump Secondary Circuit Low	P0231	This DTC detects if the fuel pump control circuit is shorted to low. Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if current >= 18A [25A for high performance variants. FPPM reports Not Faulted enumeration if current < 18A FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current sample due to other conditions.	Power driver output current	Current > 18.0 A	a) Hardware configuration cal [KeFCBR_e_ChassisFuelPresSysType] b) Diagnostic Enabled [KeFAFR_b_FPPM_DrvrGshtDiagEnbl] c) Diagnostic System Disabled [DRER] d) Fuel Control Enable command e) Fuel Control Device Ground Short diagnostic delay timer f) Measured Device Supply Voltage g] FPPM Driver Status Alive Rolling Count message counter Faulted h) Fuel Control Device Run_Crank input fault j) Fuel Control Device Diagnostic Info2 Received CAN Bus2 message $0D7	a) == CeFCBR_e_DSL_ECM_FPPM_Sys b) == TRUE c) <> TRUE d) == TRUE e) > 40.00 samples f) Supply Voltage > 7.00 volts g] <> TRUE h) <> TRUE j) == TRUE	64.00 failures / 80.00 samples 1 sample/12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit High	P0232	This DTC detects if the fuel pump control circuit is shorted to high voltage Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if circuit voltage >= 4V. FPPM reports Not Faulted enumeration if circuit voltage < 4V. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current sample due to other conditions.This DTC detects if the fuel pump control circuit is shorted to low.	Voltage offset [measured relative to low state level of pump driver duty cycle pulse]	> 4.0 Volts	a) Hardware configuration cal [KeFCBR_e_ChassisFuelPresSysType] b) Diagnostic Enabled [KeFAFR_b_FPPM_DrvrPshtDiagEnbl] c) Diagnostic System Disabled [DRER] d) Fuel Control Enable command e) Arbitrated Fuel Pump Duty Cycle Rate of Change f) Measured Device Supply Voltage g] FPPM Driver Status Alive Rolling Count message counter Faulted h) Fuel Control Device Run_Crank input fault j) Fuel Control Device Diagnostic Info2 Received CAN Bus2 message $0D7	a) == CeFCBR_e_DSL_ECM_FPPM_Sys b) == TRUE c) <> TRUE d) == TRUE e) > -100.00 % / msec f) > 7.00 volts g] <> TRUE h) <> TRUE j) == TRUE	64.00 failures / 80.00 samples 1 sample/12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Open	P023F	This DTC detects if the fuel pump control circuit is Open Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if current <= 1A . FPPM reports Not Faulted enumeration if current > 1A. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current sample due to other conditions.	Fuel Pump Driver Output Current	< 1.0 Amp	a) Hardware configuration cal [KeFCBR_e_ChassisFuelPresSysType] b) Diagnostic Enabled [KeFAFR_b_FPPM_OpenCktDiagEnbl] c) Diagnostic System Disabled [DRER] d) Arbitrated Fuel Pump Duty Cycle e) Fuel Control Enable fault f] Fuel Pump Driver Over Temperature g) Fuel Control Device Run_Crank input fault h) Fuel Control Device Diagnostic Info2 Received CAN Bus2 message $0D7 j) Ignition Switch Position Run_Crank Input Voltage	a) == CeFCBR_e_DSL_ECM_FPPM_Sys b) == TRUE c) <> TRUE d) > 37.27 % e) <> TRUE f] <> TRUE g) <> TRUE h) == TRUE j) > 11.00 volts	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.
Warm Up Catalyst Efficiency Below Threshold Bank 1 (OBD2, Cold start based monitor)	P0421	Cold start based monitor: the Catalyst (CC DOC) monitor only runs at cold start when dedicated conditions to detect this situation are satisfied. The diagnostic takes advantage of the HydroCarbon stored in the cold phase and evaluates the energy produced by Catalyst during the following oxidation process (once that light-off temperature is fulfilled). The so calculated released energy is compared to the energy provided at CC DOC inlet in order to rescale the efficiency index value. Some corrections to minimize the results dispersion are finally applied. EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Catalyst (CC DOC) monitor. In MY17 sw the mentioned monitor runs in the following below exhaust configurations:	Catalyst Efficiency Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Efficiency Index < Threshold	Efficiency Index < **CatCrtdEffThrsh** [Curve] If EWMA Enbl Cal = 1.00 [Boolean] AND Catalyst FA = CAT_CatSysEffLoB1_FA Then: Efficiency Index < **CatCrtdEffRepEWMA** [Curve]	Catalyst monitor is enabled if: - Catalyst monitor enabling calibration = TRUE AND - No active DTCs: Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND Catalyst down temperature sensor not in fault (Fault Flag = FALSE) AND Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Injection system not in fault (Fault Flag = FALSE) AND Ambient temperature information not in fault (Fault Active = FALSE) AND Vehicle speed information not in fault (Fault Active = FALSE) AND Catalyst down hydrocarbon estimation not in fault (Fault Flag = FALSE) AND Soaking time information not in fault (Fault Active = FALSE)	Catalyst monitor is enabled if: Cat Monitor Enbl Cal = **CatMontrEnbl** [Boolean] AND No active DTCs [Boolean]: Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (OAT_PtEstFiltFA) AND Veh Speed FA = NOT (VehicleSpeedSensor_FA) AND Cat Dwn HC Flt = NOT (CAT_HC_CatDwnFlt) AND Eng Mode Not Run Timer = NOT (	Task Time = 100 [ms] If - Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) Then: 1 trip (with malfunction) to set DTC (Type A)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		- C_DPF_UI_SCR: Close Coupled DOC (Catalyst) --> Diesel Particulate Filter --> Urea Injector --> Selective Catalyst Reduction			AND Engine coolant temperature information not in fault (Fault Flag = FALSE) AND - Engine running AND - Ambient conditions satisfied: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Cold start conditions detected: Engine coolant temperature lower or equal than calibration AND Catalyst down exhaust temperature (by sensor) lower or equal than calibration AND Soaking time higher or equal than calibration AND Catalyst stored HydroCarbon quantity lower or equal than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving	EngineModeNotRunTimer_FA) AND Eng Cool Temp Flt = NOT (ECT_Sensor_FA & ECT_Sensor_TFTKO) AND Engine running AND Ambient conditions satisfied [Boolean]: Amb Press > 74.80 [KPa] AND Amb Temp > 266.00 [K] AND Cold start conditions detected [Boolean]: Eng Cool Temp <= 55.00 [°C] AND Cat Dwn Temp Snsr <= 55.00 [°C] AND Soak Time >= 0.00 [s] AND Cat Stored HC <= 1.20 [g] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run	If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 4.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					cycle): Catalyst down estimated temperature (by 1dk thermal model) lower than calibration AND - Catalyst monitor not aborted in current driving cycle: Integration time (monitoring time) lower than calibration AND Integration time (monitoring time) higher or equal than calibration; Catalyst monitor integration is enabled if: - Catalyst up exhaust temperature (by sensor) higher than calibration If Catalyst up exhaust temperature (by sensor) lower than calibration integration is reset - Catalyst up exhaust flow higher than calibration; Catalsyt monitor integration is frozen if: - Catalyst up exhaust flow lower than calibration If Catalyst up exhaust flow higher than calibration integration is re-enabled; Diagnostic test evaluation is triggered if:	only once per driving cycle) [Boolean]: Cat Dwn Temp (by 1dk thermal model) < 180.00 [°C] AND Catalyst monitor not aborted in current driving cycle [Boolean]: Integr Time (Montr Time) < 110.00 [s] AND Integr Time (Montr Time) >= 320.00 [-]; Catalyst monitor integration is enabled if: Cat Up Temp Snsr > 150.00 [°C] If Cat Up Temp Snsr < 140.00 [°C] integration is reset Cat Up Exh Flow > -20.00 [g/s]; Catalsyt monitor integration is frozen if: Cat Up Exh Flow < -20.00 [g/s] If Cat Up Exh Flow > -20.00 [g/s] integration is re-enabled; Diagnostic test evaluation	Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Rapid Response (RR) (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 1 trip (with no mulfunction) to report pass	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- Catalyst down estimated temperature (by 1dk thermal model) higher or equal than calibration.	is triggered if: Cat Dwn Temp (by 1dk thermal model) >= 180.00 [°C].	- 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Output Speed Sensor (TOSS)	P0502	The diagnostic monitor detects no activity in the TOSS circuit due to an electrical fault, wiring fault or sensor fault. The TOSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TOSS signal registers below a threshold, the DTC will set.	transmission output speed raw	≤ 60 RPM	service mode $04 active diagnostic monitor enable PTO active ignition voltage (controller run crank ignition in range) engine load enable occurs when: (accelerator pedal position engine torque) engine load disable occurs when: (accelerator pedal position engine torque OR accelerator pedal position engine torque) brake pedal position brake pedal position engine speed engine speed P0503 test fail this key on if clutch pedal is enabled clutch pedal position clutch pedal position P0502 test fail this key on OR P0502 fault active DTCs not fault active	= FALSE = 1 Boolean = FALSE ≥ 11.00 volts ≥ 20.0 % ≥ 100.0 Nm ≤ 6.0 % ≤ 30.0 Nm > 6.0 % ≤ 30.0 Nm ≤ 1.9 % < 80.0 % ≥ 6,500.0 RPM ≤ 2,200.0 RPM = FALSE = 1 Boolean ≥ 89.0 % > 84.0 % = FALSE = FALSE AcceleratorPedalFailure EngineTorqueEstInaccurate	fail time ≥ 4.5 seconds 100 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Output Speed Sensor (TOSS)	P0503	The diagnostic monitor detects an unrealistic drop in the TOSS signal due to a sudden electrical fault, wiring fault or sensor fault. The TOSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TOSS signal drops above a delta threshold, a fail timer is enabled. When a TOSS drop occurs it is possible to enable the P0502 fail time as well as the P0503 fail time. With both P0502 and P0503 fail timers active it is a race condition to either DTC.	ABS(raw transmssion output speed current loop - raw transmssion output speed previous loop), 25 millisecond update rate	≥ delta fail threshold RPM	service mode $04 active diagnostic monitor enable PTO active ignition voltage (controller run crank ignition in range)	= FALSE = 1 Boolean = FALSE ≥ 11.00 volts	fail time ≥ 3.250 seconds, increment fail count, fail count ≥ 5 counts, 25 millisecond update rate	Type A, 1 Trips
					4WD range current loop, update 4WD range time, reset 4WD range time when 4WD range current loop	≠ 4WD range previous loop ≠ 4WD range previous loop	4wd range time ≥ 6.00 seconds	
					raw transmission output speed OR last valid transmision output speed before delta drop, update transmission output speed active time	≥ 300.0 RPM ≥ 300.0 RPM	transmission output speed active time ≥ 2.00 seconds	
					25 millisecond loop to loop transmision output speed positive delta, update transmission output speed stable time	≤ 150.0 RPM	transmission output speed stable time ≤ 2.000 seconds	
					P0503 fault active OR P0503 test fail this key on	= FALSE = FALSE		
					if shift lever position is enable: (shift lever position previous loop AND shift lever position current loop) OR shift lever position current	= 1 Boolean = NEUTRAL = IN GEAR = IN GEAR	shift lever position stablity time ≥ 0.500 seconds	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Single Stage Oil Pump	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure rationality diagnostic has two parts: engine runing test and engine off test. The engine running test compares the sensed oil pressure to a mathematical prediction of oil pressure; while the engine off test checks for a biased high engine oil pressure sensor after the engine has stopped rotating.	**Single Stage Oil Pump EOP Sensor Test with Engine Running** If enabled: To fail a currently passing test: The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.): To pass a currently failing test: The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	< -20.0 kPa OR > 20.0 kPa > -10.0 kPa AND < 10.0 kPa	Two Stage Oil Pump is Present = FALSE Diagnostic Status Oil Pressure Sensor In Use Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor value that is a function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability. (**P0521_RPM_Weighting_Factor - Single Stage Oil Pump** * **P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump** * **P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump** * **P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump**	TRUE Disabled Yes >= 0.10 weighting	Performed every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					) with a first order filter coefficient of 0.10 (See Details on P0521 Supporting Tables Tab) **P0521_RPM_Weighting_Factor - Single Stage Oil Pump** **P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump** **P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump** **P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump**			
					No active DTC's	Fault bundles: EngOilPressureSensorCktFA CrankSensor_FA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 5.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Sensor Performance	P0531	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**Engaged Test** <u>Primary Enable Conditons:</u>		Compressor Type = Electric Driven Diagnostic Status Engaged Test Status Enable with Key Off No active DTC's	Electronic Varaible Disabled Disabled Disabled Fault bundles: ACHighSidePressSnsrCkt FA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm		Type B, 2 Trips
			<u>To fail a currently passing Engaged test:</u> The filtered, weighted ratio between measured Delta and predicted delta (a function of ambient temp, coolant temp, vehicle speed, and fan speed.):	Measured Test Delta Pressure ÷ Predicted Engaged Test Filtered Weighted Pressure) * first order filter coefficient < 0.0000 Predicted Engaged Test Filtered Weighted Pressure = (**P0531_Coolant_Weighting_Factor** * **P0531_FanSpeed_Weighting_Factor** * **P0531_Delta_Predicted_ Pressure** * **P0531_Delta_Predicted_Quality_Factor**) with a 1st order filter coefficient =	Use First Order Filter = FALSE Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor values: 0.00	Compressor Speed > 0 RPM **P0531_Delta_Predicted_Quality_Factor** > 0.0 and **P0531_Coolant_Weighting_Factor** > - 0.0 AND < 16.0 and **P0531_FanSpeed_Weighting_Factor** > - 0.0 AND < 16.0	Performed every 100 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				(P0531 Engage Test Details on Supporting Tables Tab: **P0531_Coolant_Weighting_Factor** **P0531_FanSpeed_Weighting_Factor** **P0531_Delta_Predicted_ Pressure** **P0531_Delta_Predicted_Quality_Factor**)	Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to Initial response test ratio: FIR Test Ratio = 0.00 with an initial response first order filter: FIR Test Filter = 0.00 Rapid Step Response (RSR): RSR will trigger if the ratio result from the last test is < 0.00 AND the delta from the last filtered ratio by > 0.00 Once triggered, the RSR filtered ratio is reset to: RSR Test Ratio = 0.00 with an rapid step response first order filter: RSR Test Filter = 0.00		0 FIR tests must complete before the diagnostic can report. 0 RSR tests must complete before the diagnostic can report.	
			To pass a currently failing Engaged test: The filtered, weighted ratio between measured delta and predicted delta (a function of ambient temp, coolant temp,	Measured Test Delta Pressure / Predicted Engaged Test: Filtered Weighted Pressure) * first order	Use First Order Filter = FALSE Quality or weighting factor values less than "1" indicate that we don't	Compressor Speed > 0 RPM **P0531_Delta_Predicted_Quality_Factor** > 0.0	Performed every 100 msec # of Test Samples = 100	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			vehicle speed and fan speed.):	filter coefficient => 0.0000 Predicted Engaged Test Filtered Weighted Pressure = (**P0531_Coolant_Weighting_Factor** * **P0531_FanSpeed_Weighting_Factor** * **P0531_Delta_Predicted_ Pressure** * **P0531_Delta_Predicted_Quality_Factor**) with a first order filter coefficient = (P0531 Engage Test Details on Supporting Tables Tab: **P0531_Coolant_Weighting_Factor** **P0531_FanSpeed_Weighting_Factor** **P0531_Delta_Predicted_ Pressure** **P0531_Delta_Predicted_Quality_Factor**)	have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor values: 0.00 Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to Initial response test ratio: FIR Test Ratio = 0.00 with an initial response first order filter: FIR Test Filter = 0.00 Rapid Step Response (RSR): RSR will trigger if the ratio result from the last test is < 0.00 AND	and **P0531_Coolant_Weighting_Factor** > - 0.0 AND < 16.0 and **P0531_FanSpeed_Weighting_Factor** > - 0.0 AND < 16.0	0 FIR tests must complete before the diagnostic can report. 0 RSR tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the delta from the last filtered ratio by > 0.00 Once triggered, the RSR filtered ratio is reset to: RSR Test Ratio = 0.00 with an rapid step response first order filter: RSR Test Filter = 0.00			

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.
Shared High Side Drive #1 Control Circuit Low (STG) - (GEN III Controllers ONLY)	P0658	Controller specific output driver circuit diagnoses the shared high sided driver # 1 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	Shared high side drive #1 low 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.
Shared High Side Drive #1 Control Circuit High (STP) - (GEN III Controllers ONLY)	P0659	Controller specific output driver circuit diagnoses the shared high sided driver # 1 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	Shared high side drive #1 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.
Two Stage Oil Pump Control Circuit Open	P06DA	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit ≥ 200 k Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Two Stage Oil Pump Control Circuit Short To Ground)

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Performance - Two Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y = 15 times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.6 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** + **P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P06DD_P06DE_OP_LoStatePressure**)	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 4 errors out of 5 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		
					Passive Criteria:			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	70.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			Fast Pass Condition		Common Criteria:		0 errors out of 5 samples.	
			Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change -	Two Stage Oil Pump is Present	TRUE	Run once per trip or activiated by the Passive Test	
					Engine Running	≥ 10.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above a threshold	filtered oil pressure after 1.6 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P06DD_P06DE_OP_LoStatePressure**)	Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: Active Criteria: One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range	≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO CrankSensor_FA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.6 seconds 50.0 deg C ≤ Oil Temp ≤ 100.0 deg C 1,400 RPM ≤ Filtered Engine Speed ≤ 2,640		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit StuckOn - Two Sided	P06DE	Diagnoses the two stage oil pump is stuck in the low pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from a passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.6 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure) ÷ 2** (see P06DE details on Supporting Tables Tab)	<u>Common Criteria</u>: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria</u>: One Sided Performance	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 4 errors out of 5 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Test = Disabled			
					Oil Pump in Low State	> 1.6 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Filtered Engine Speed within range	1,400 RPM ≤ Filtered Engine Speed ≤ 2,640 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DE details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Passive Criteria:			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	70.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab)	TRUE		
			Fast Pass Condition Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.6 seconds] Oil Pressure delta <	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed	 TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P06DD_P06DE_OP_StateChangeMin (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressure** (**re** - **P06DD_P06DE_OP_LoStatePressure**) / 2 (P06DD Performance Test Details on Supporting Tables Tab)	> 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control : Active Criteria: One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Engine Torque within range	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.6 seconds 50.0 deg C ≤ Oil Temp ≤ 100.0 deg C 1,400 RPM ≤ Filtered Engine Speed ≤ 2,640 RPM **P06DD_P06DE_MinEnableTorque_OP** ≤		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (P06DD Performance Test Details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	60.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 300.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	A Clutch Pedal position sensor range fault is detected, if Clutch Pedal Position Sensor is in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that the ratio of engine RPM versus Transmission Output Speed (N/TOS) represents a valid gear. When this occurs a clutch pedal position error is measured and processed by a 1st order lag filter. When this clutch pedal position error exceeds the defined threshold, a this fault code is set.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 4 %	N/TOS Ratio:	Must match actual gear (i.e. vehicle in gear)	25 ms loop Continuous	Type A, 1 Trips
					Transfer Case:	Not in 4WD Low range		
					Vehicle speed:	> 6.2 MPH		
					Engine Torque:	> **P0806 EngTorqueThreshold Table** (see Supporting Tables)		
					Clutch Pedal Position:	< **P0806 ResidualErrEnableLow Table** (see Supporting Tables)		
					OR	> **P0806 ResidualErrEnableHigh Table** (see Supporting Tables)		
					No Active DTCs:	ClutchPstnSnsrCktHi FA ClutchPstnSnsrCktLo FA CrankSensor_FA Transmission Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Low	P0807	A continuous circuit Out-of-Range Low or open fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is below the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	 > 10.0 Volts	400 counts out of 500 samples 25 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit High	P0808	A continuous circuit Out-of-Range High fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is above the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	 > 10.0 Volts	400 counts out of 500 samples 25 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Not Learned	P080A	During final assembly at the manufacturing facility an initial Clutch Pedal Applied Learn is established. This Learn is used to understand the variation in the clutch fully applied position vs. the clutch pedal position. This position is then adjusted over time based on a learning algorithm in the engine controller to adjust for clutch physical wear with usage. This Diagnostic is used to detect when this Applied Learn value is outside of defined range based on the thresholds set by the diagnostic. If the Applied Learn value is outside of the range of the threshold values this fault code is set. The OBD Manufacturer's enable counter is utilized to prevent the MIL from setting during the vehicle assembly before a Position lean can be completed in the manufacturing facility.	Fully Applied Learn Position OR	< 12.0 % > 35.0 %	OBD Manufacturer's Enable Counter	= 0	250 ms loop Continuous	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Signal Message Counter Incorrect	P129E	To detect if the command message received as serial data from the engine control module is valid The "rolling count check" value is created by adding an appended hexadecimal calculation to the pump duty cycle command value. In order to achieve a desired fuel pressure, a hexadecimal equivalent value representing the necessary fuel pump current pulse "On" time (duty cycle as a percent value) is transmitted to the FPPM. The corresponding "check" value is transmitted as well. At the FPPM, the received duty cycle command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported	FPPM Received Duty Cycle Rolling Count	<> ECM Transmitted Duty Cycle Rolling Count	a) Diagnostic enabled [FAFR_b_FPPM_RxdDC_RC_DiagEnbl] b) FPPM Control Status Alive Rolling Count check faulted c) Fuel Control Device Diagnostic Info1 Received CAN Bus2 message $0D5	a) == TRUE b) <> TRUE c) == TRUE	64.00 failures / 80.00 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Received Duty Cycle Protection Value	<> ECM Transmitted Duty Cycle Protection Value	a) Diagnostic enabled [FAFR_b_FPPM_RxdDC_PV_DiagEnbl] b) FPPM Control Status Alive Rolling Count check faulted c) Fuel Control Device Diagnostic Info1 Received CAN Bus2 message $0D5	a) == TRUE b) <> TRUE c) == TRUE	64.00 failures / 80.00 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		forward to the ECM where X/Y diagnostic counting is performed.						

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 over LIN bus is incorrect or the Shutter Module signals it has an internal error for out of total samples	 >= 10.00 counts >= 10.00 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
DC/DC Converter Actuator Voltage Signal Message Counter Incorrect	P155E	This DTC monitors for an error in communication with the DC/DC Converter Actuator Voltage Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 10 counts >= 10 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Performance Signal Message Counter Incorrect	P155F	This DTC monitors for an error in communication with the DC/DC Converter Internal Health Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 10 counts >= 10 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
Air Conditioning (A/C) Refrigerant Pressure Too High When A/C Off	P156A	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**Off Test:** The pressure sensor has to be greater than a threshold value when AC is off (a function of ambient temp)	Off Test Pressure > **P156A_Off_Test_Threshold** (function of ambient temperature) (P156A Off Test Details on Supporting Tables:)	Diagnostic Status Off Test Status AC Off Time No active DTC's	Disabled Disabled Delay Time > **P156A_Off_Test_Delay** Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning (A/C) Refrigerant Pressure Too Low When A/C On	P156B	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**On Test:** The pressure sensor has to be less than a threshold value when engaged (a function of ambient temp)	On Test Pressure < **P156B_On_Test_Threshold** (function of ambient temperature) (P156B On Test Details on Supporting Tables:)	Diagnostic Status On Test Status AC On Time No active DTC's	Disabled Disabled Delay Time > 20 Sec. Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm	80 failures out of 100 samples Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning (A/C) Refrigerant Pressure Too High After Soak Time	P156C	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	**Cold Test:** The pressure sensor has to be greater than a threshold value when propulsion system is off for a ambient stabilization time	Cold Test Pressure > **P156C_Cold_Test_Threshold** (function of ambient temperature) (P156C Cold Test Details on Supporting Tables)	Diagnostic Status Cold Test Status AC has been enabled this Trip Enable Timer AC Soak Timer - the soak timer can be established (via calibration enable) to be minimum of the Engine Off Time, and/or the Propulsion System Off Time, and/or the Battery Thermal Conditioning Off Time Difference between Coolant Temperature and Air Temperature No active DTC's	Disabled Disabled FALSE Enabled Time > 1.0 Sec. Minimum Soak Time => 28,800 Sec. Use Engine Off Soak Time = FALSE Use Propulsion Off Soak Time= FALSE Use Battery Off Soak Time = FALSE Temp Diff < 0.0 Deg C Fault bundles: ACHighSidePressSnsrCktFA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm ECT_Sensor_DefaultDetected	80 failures out of 100 samples Report Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Signal Message Counter Incorrect	P156D	This DTC monitors for an error in communication with the DC/DC Converter Run/ Crank Terminal Status Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 10 counts >= 10 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Signal Message Counter Incorrect	P156E	This DTC monitors for an error in communication with the DC/DC Converter Crank Control Terminal Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 10 counts >= 10 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = 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.
Performance Traction Torque & Speed Request Circuit	P2548	Determines if torque and/or speed request from the EBTCM is valid	Protection error - Serial Communication message ($1C8) 2's complement not equal Torque Request Speed Request OR Rolling count error - Serial Communication message ($1C8) rolling count index value	 Message <> two's complement of message Message <> two's complement of message Message <> previous message rolling count value + one	Diagnostic Status Run/Crank Active Ignition Voltage No Serial communication loss to EBTCM (U0121)	Enabled > 0.50 seconds > 6.41 volts No loss of communication	Fail Threshold: >= 10 failures out of 20 samples Pass Threshold: >= 10 samples during key cycle. OR Fail Threshold >= 6 Rolling count errors out of 10 samples Performed on every received message	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch position is in an invalid position. Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the hood switch reading is invalid in these ranges With a discrete type switch the hood switch reading is invalid when With a percentage type switch the hood switch reading is invalid in these ranges With a resistance type switch the hood switch reading is invalid in these ranges	1281 Ohms to 1404 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) 100.00 % to 100.00 % or 100.00 % to 100.00 % or 100.00 % to 100.00 % 10,000.00 Ohms to 10,000.00 Ohms or 10,000.00 Ohms to 10,000.00 Ohms or 10,000.00 Ohms to 10,000.00 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 0 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	3 failed samples within 10 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Short to Ground / Low Voltage	P257E	This DTC monitors the hood switch for a short to ground or low voltage condition	Hood Switch position reading is outside an expected bounds for Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the bound is hood switch reading With a discrete type switch the bounds are With a percentage type switch the bound is hood switch reading With a resistance type switch the bound is hood switch reading	<= 325 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) <= 100.00 % <= 10,000.00 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 0 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	3 failed samples within 10 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Short to Voltage / High Voltage	P257F	This DTC monitors the hood switch for a short to voltage or high voltage condition	Hood Switch position reading is outside an expected bounds for Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the bound is hood switch reading With a discrete type switch the bounds are With a percentage type switch the bound is hood switch reading With a resistance type switch the bound is hood switch reading	>= 3620 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) >= 100.00 % >= 10,000.00 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 0 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	3 failed samples within 10 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Piston Cooling Oil Control Circuit Open	P25A9	Controller specific output driver circuit diagnoses the oil piston cooling jet low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit ≥ 200 k Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset	1.00 >= 11.00 = True = False = False	>= 40.00 errors out of 50.00 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Piston Cooling Oil Control Circuit Low	P25AA		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 signal and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset	1.00 >= 11.00 = True = False = False	>= 40.00 errors out of 50.00 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Piston Cooling Oil Control Circuit High	P25AB		Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset	1.00 >= 11.00 = True = False = False	>= 40.00 errors out of 50.00 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Piston Cooling Oil Control Circuit Performance /Stuck Off	P25AC		Fail from passing state: Piston cooling jet oil pressure switch state when the piston cooling jet is commanded to be closed	= False	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset Engine Movement Engine Oil Pressure No active DTC's for diagnsotic enable: No TFTKO: The amount of time of valve is commanded to close	1.00 >= 11.00 = True = False = False = True >= 206.00 Fault bundles: EngOilPressureSensorFA PistonCoolingCktFA PistonCoolingFA PistonCoolingStuckClosed PistonCoolingStuckClosed >= 8.00	>= 40.00 errros out of 50.00 samples.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Piston Cooling Oil Control Circuit Stuck On	P25AD		Fail from passing state: Piston cooling jet oil pressure switch state when the piston cooling jet is commanded to be open	= True	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State Diagnostic System Reset Engine Movement Engine Oil Pressure No active DTC's for diagnsotic enable: No TFTKO: The amount of time of valve is commanded to close	1.00 >= 11.00 = True = False = False = True >= 206.00 Fault bundles: EngOilPressureSensorFA PistonCoolingCktFA PistonCoolingFA PistonCoolingStuckOpen PistonCoolingStuckOpen >= 3.00	>= 40.00 errors out of 50.00 samples.	Type B, 2 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 ≤ 10.00 % ≥ 10.00 % CeTRGD_e_VoltDirctProp	fail time ≥ 1.00 seconds out of sample time ≥ 1.50 seconds battery voltage timer ≥ 1.00 seconds	Type A, 1 Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Sensor B Circuit 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 ≥ 92.00 % ≤ 92.00 % CeTRGD_e_VoltDirctProp	fail time ≥ 1.00 seconds out of sample time ≥ 1.50 seconds battery voltage timer ≥ 1.00 seconds	Type A, 1 Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Park Brake Control Module	U0128	This DTC monitors for a loss of communication with the Park Brake Control Module	Message is not received from controller for Message $TBD	≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U0128	Not Active on Current Key Cycle		
					Park Brake Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Brake System Control Module	U0129	This DTC monitors for a loss of communication with the Brake System Control Module (OBD Module ID 7E5).	Message is not received from controller for Message $0C1 Message $0C5 Message $1C7 Message $1E9 Message $2F1 Message $2F9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U0129	Not Active on Current Key Cycle		
					Brake System Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module	Message is not received from controller for Message $1E5	 ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No MIL, Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0131	Not Active on Current Key Cycle		
					Power Steering Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication LIN Bus 1 Off	U1501	This DTC monitors for a LIN bus off condition	LIN bus off failures	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 400.00 milliseconds =Run >= 11.00 Volts	Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
LIN Bus 1 Lost Communication with Device 0 (Shutter 1)	U1510	This DTC monitors for a loss of communication on the LIN bus with Shutter 1	ECM has lost communication over the LIN bus with Device 0 / Shutter 1 for	>= 3.00 counts	The following criteria have been enabled for	>= 400.00 milliseconds	LIN bus communication executes in 500ms loop	Type B, 2 Trips
					Power Mode	=Run		
					Run/Crank Voltage	>= 11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Lost Communication with ECM/PCM	U2616	To detect lost serial data communication from the ECM	Time - Fuel System Control message CAN $0D9 not received (FPPM Received Serial Data Communication Status)	t > 10 sec	a) Diagnostic Enabled [KeFAFR_b_FPPM_FuelCntrlEnblEnbl] b) Diagnostic System Disabled c) FPPM Control Status Alive Rolling Count check faulted d) Fuel Control Device Diagnostic Info1 Received CAN Bus2 message $0D5 e) Ignition Sw Run_Crank Position Ckt Input Voltage f) Run_Crank Active g1) Sensor Bus Relay On OR g2) Hardware configuration cal [KeFCBR_e_ChassisFuelPresSysType]	a) == TRUE b) <> TRUE c) <> TRUE d) == TRUE e) > 7.00 volts f) == TRUE g1) == TRUE OR g2) <> CeFCBR_e_DSL_ECM_FPPM_Sys	64.00 failures / 80.00 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor - Crankshaft Start Position Incorrect	P034A	Monitors the position of the crankshaft during auto-start's to verify that the crankshaft is in the expected position- diagnostic will fail if the crankshaft is not in the expected range otherwise the diagnostic will pass	Crankshaft position is in error by a number of crankshaft wheel teeth	> 1 crankshaft teeth	Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	CrankSensor_FA	1 failures out of 3 samples a sample occurs each time the engine is started	Type B, 2 Trips
			Crankshaft position is in error by at least one crankshaft wheel tooth		Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	CrankSensor_FA	4 failures out of 5 samples a sample occurs each time the engine is started	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor - Crankshaft Direction Incorrect	P034B	Detects if the crankshaft is not rotating in the correct direction- will fail if the engine is reported to be spinning backwards while the engine is running otherwise the diagnostic will pass.	Number of crankshaft sensor reversals within a period of time	>= 3 <= 10.0 seconds	Engine Speed Engine Speed Engine Air Flow Engine Movement Detected No Active DTCs:	> 400 RPM < 2,000 RPM >= 2.0 grams/second CrankSensor_FA	Continuous Every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Assist Vacuum Too Low	P050F	Monitors for a brake booster vacuum leak	Brake booster vacuum drift ratio (EWMA) reaches the fail threshold (based on engine running condition) before the sample count threshold is reached, a failure is reported.		Diagnostic is enabled	Disabled	Performed every 100 msecond Minimum time to pass: Engine Running 1.00 second Engine Stopped 1.00 second	Type B, 2 Trips
					and the following conditions are met for engine run conditions:			
			Engine Running Fail Threshold based on prior diagnostic state (description below)		No brake booster vacuum sensor faults active			
			Diagnostic failed prior loop	>= 0.90	No brake pedal position sensor faults active			
			Diagnostic passed prior loop	>= 0.90	Brake pedal travel is	< 100.00 percent - 5.00 percent offset		
					No mass air flow faults			
			Before the sample counts	> 10.00 counts	No manifold air pressure faults			
			Engine Stopped Fail Threshold based on prior diagnostic state (description below)		Mass air flow estimate	>= 6.00 grams / second		
					Manifold air pressure	<= 40.00 kPa		
			Diagnostic failed prior loop	>= 0.90	Engine vacuum stability time has reached	>= 4.00 seconds		
			Diagnostic passed prior loop	>= 0.90				
			Before the sample counts	> 10.00 counts	Difference between brake booster vacuum and manifold air pressure is	> 4.00 kPa		
					OR			
					Diagnostic is enabled for the following engine auto off conditions:	Disabled		
					No brake booster vacuum			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor faults active			
					No brake pedal position sensor faults active			
					Brake pedal travel is	< 100.00 percent - 5.00 percent offset Disabled		
					No engine movement detected			
					Engine is in AutoStop mode			
					OR			
					Diagnostic is enabled for the following key off conditions:			
					No brake booster vacuum sensor faults active			
					No brake pedal position sensor faults active			
					Brake pedal travel is	< 100.00 percent - 5.00 percent offset		
					No engine movement detected			
					Engine is in KeyStop mode			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system.		Throttle Area (with idle included) for time period of	<= 5.0 Percent for > 5.0 seconds	Pass counter incremented when enable conditions are met, pass achieved when counter >= 5	Type B, 2 Trips
					Difference in Brake Booster Vacuum	> 0.3 kPa		
					For time period of AND	>= 0.3 Seconds		
					Vacuum Delta	>= 6.0 kPa	Performed every 100 msec	
					Diagnostic enabled/ disabled	Diabled		
					No active DTC's	Fault bundles: MAP_SensorFA TPS_FA BrakeBoosterSensorCktFA		
			1st order lag fail threshold	> 0.20				
			1st order lag re-pass threshold	< 0.6				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) ÷ 5 Volts *100	< 5.00 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	320 failures out of 400 samples Performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) ÷ 5 Volts *100	> 95.00 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	2,000 failures out of 2,400 samples Performed every 12.5 msec	Type B, 2 Trips

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Erratic	P100C	This DTC monitors for an erratic Temperature signal via LIN bus from the Battery Monitor Module	Communication of the Temperature signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	>= 4 counts >= 5 counts	The diagnostic is enabled All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= 1 (1 indicates enabled) >= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit Erratic	P100D	This DTC monitors for an erratic Temperature Circuit signal via LIN bus from the Battery Monitor Module	Communication of the Temperature Circuit signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	>= 4 counts >= 5 counts	The diagnostic is enabled All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= 1 (1 indicates enabled) >= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal	Communication of the Alive Rolling Count from the Battery Monitor Module over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples	 >= 10 counts >= 10 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit Low Voltage	P16D4	This DTC monitors for a battery module low voltage circuit fault	Battery Module signals a low voltage circuit fault via LIN bus VeVITR_U_12VBattVolt	< 3.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

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

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

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Data Incompatible	P16E3	This DTC monitors for a battery module data incompatible fault	Battery Module data received over LIN bus is incompatible. (Measured by any of the following)		The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled	= 1 (1 indicates enabled) = 1 (1 indicates enabled)	Diagnostic runs in the 250 ms loop	Type B, 2 Trips
			Historical Test	Upon IBS wakeup, if any of the below Historical Test conditions are satisfied, the diagnostic fails.	System Diagnostics Disabled	= False		
					Power Mode	Not equal off		
					12V System Reference Voltage	> 9.00 Volts		
			Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 84.59 Ah)	> 5.00 Ah	LIN Bus Off or Battery Module Communication Faults Active	= False		
			or					
			IBS Returns a battery type that is not equal to	CeBSER_e_IBS_Cfg BatAGM	Outside Air Temperature	> -20.00 Celsius and < 50.00 Celsius		
			or		Outside Air Temperature Validity Bit	= True		
			Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.10 V)	> 0.50 Volts	IBS Configuration Data Available over LIN bus	= True		
			or		Historical Test Only Host Controller MEC Counter	<= 0		
			Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.65 V)	> 0.50 Volts				
			Continuous Test	If any of the below conditions are satisfied				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				for 16.00 fail counts out of 20.00 sample counts, the diagnostic fails.				
			Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 84.59 Ah)	> 5.00 Ah				
			or					
			IBS Returns a battery type that is not equal to	CeBSER_e_IBS_CfgBatAGM				
			or					
			Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.10 V)	> 0.50 Volts				
			or					
			Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.65 V)	> 0.50 Volts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake System Control Module Requested MIL Illumination	P25A2	Monitors the Brake System Control Module MIL request message to determine when the Brake System Control Module has detected a MIL illuminating fault.	Brake System Control Module Emissions-Related DTC set and module is requesting MIL	Brake System 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.
Brake System Control Module B Requested MIL Illumination	P25C9	Monitors the Brake System Control Module B MIL request message to determine when the Brake System Control Module B has detected a MIL illuminating fault.	Brake System Control Module B Emissions-Related DTC set and module is requesting MIL	Brake System Control Module B Emissions-Related DTC set and module is requesting MIL		Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit Open (12VSS)	P26E4	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground.	Starter relay pinion diag enable Engine speed Run Crank voltage	= 1.00 0.00 RPM 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit Low Voltage (12VSS)	P26E5	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 0.5 Ohms impedance between signal and controller ground	Starter control diag enable Engine speed Run Crank voltage	= 1.00 0.00 RPM 6.41 volts	8 failures out of 10 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit High Voltage (12VSS)	P26E6	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	 <= 0.5 Ohms impedance between signal and controller power	Starter control diag enable Engine speed Run Crank voltage	= 1.00 0.00 RPM 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 Low Voltage	P3051	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 1	< 1 Volt	Diagnostic enabled Run/Crank or Accessory	TRUE TRUE	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 Low Voltage	P3052	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 2	< 1 Volt	Diagnostic enabled Run/Crank or Accessory	TRUE TRUE	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 High Voltage	P3053	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 1	> 28 Volt	Diagnostic enabled Run/Crank or Accessory	TRUE TRUE	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 High Voltage	P3054	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 2	> 28 Volt	Diagnostic enabled Run/Crank or Accessory	TRUE TRUE	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage 1 Performance	P3055	Detects DC/DC Converter Actuator Voltage 1 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine running OR Engine stopped	TRUE TRUE for > 160 loops in 6.25 ms loop for > 160 loops in 6.25 ms loop	640 failed samples out of 800 samples in a 6.25 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto-Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE for >0 loops in 6.25 ms loop	16 failed samples out of 32 samples in a 6.25 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE has occurred	2 failed auto-crank events out of 3 consecutive auto-crank events	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage 2 Performance	P3056	Detects DC/DC Converter Actuator Voltage 2 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine running OR Engine stopped	TRUE TRUE for > 160 loops in 6.25 ms loop for > 160 loops in 6.25 ms loop	640 failed samples out of 800 samples in a 6.25 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto-Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE for > 0 loops in 6.25 ms loop	16 failed samples out of 32 samples in a 6.25 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE has occurred	2 failed auto-crank events out of 3 consecutive auto-crank events	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Ciruit High Voltage	P305B	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit high faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory	TRUE FALSE TRUE	320 failed samples out of 400 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Ciruit Low Voltage	P305C	Diagnoses the DC/DC Converter Switch Run/ Start Position circuit for circuit low faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory	TRUE TRUE TRUE	640 failed samples out of 800 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Circuit High Voltage	P305D	Diagnoses the DC/DC Converter Crank Control Circuit for circuit high faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled Run/Crank ECM Crank Control	TRUE TRUE FALSE	640 failed samples out of 800 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Circuit Low Voltage	P305E	Diagnoses the DC/DC Converter Crank Control Circuit for circuit low faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled Run/Crank or Accessory ECM Crank Control	TRUE TRUE TRUE	24 failed samples out of 32 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on LIN bus	Message is not received from controller for ECM has lost communication over the LIN bus with Battery Monitor Module for	>= 3 counts	The following criteria have been enabled for	>= 400.00 milliseconds	Between 100ms and 175ms due to rate of LIN communication to Battery Monitor Module.	Type B, 2 Trips
					Power Mode	=Run		
					Run/Crank 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 DC/ DC Converter Control Module on Bus B	U18A7	This DTC monitors for a loss of communication with the DC/DC Converter Control Module on Bus B	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					U0074	Not Active on Current Key Cycle		
			Message $0A0	≥ 10.0 seconds	Normal CAN transmission on Bus B	Enabled		
			Message $1D2	≥ 10.0 seconds	Device Control	Not Active		
					High Voltage Virtual Network Management	Not Active		
					Ignition Voltage Criteria:			
					Run/Crank Ignition voltage	> 6.41 Volts		
					Power Mode	= run		
					Off Cycle Enable Criteria:			
					KeCAND_b_OffKeyCycleDiagEnbl	= 1 (1 indicates enabled)		
					Ignition Accessory Line and	= Active		
					Battery Voltage	> 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for	> 0.4000 seconds		
					U18A7	Not Active on Current Key Cycle		
					DC/DC Converter Control Module	is present on the bus		

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 checks if the VGT vanes got mechanically stuck in any positions	absolute value of position tracking error (setpoint position - measured position) > positive threshold	> 16.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Position control in closed loop (no faults present on VGT position sensor, VGT vanes, position deviation) Position setpoint is in steady state conditions for a certain time Engine coolant temperature > threshold No faults present on engine coolant temperature sensor Outside air temperature > threshold No faults present on	== 1.00 > 11.00 [V] CFM_VGT_CommFA == FALSE VGT_SmartActrFA == FALSE VGT_PstnSnsrOfstFA == FALSE < 100.00 [%/s] > -100.00 [%/s] for 0.50 [s] > -60.00 [°C] ECT_Sensor_FA == FALSE > -60.00 [°C] OAT_PtEstFiltFA	320.00 fail count out of 400.00 sample counts 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.
					outside air temperature sensor	==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 Performance	P007B	This monitor checks if the CAC up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	> 20.00 [°C]	Test enabled by calibration	== 1.00	Test executed after a counter of 1.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>= 0.10 [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	< 7.00 [ohm]	Test enabled by calibration	== 1.00	50.00 fail counter over 63.00 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 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	> 1,020,852.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -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.
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 System out of the cranking phase PT relay supply voltage in range No fault validated on smart VGT rolling counters	== 1.00 > 11.00 [V] CFM_VGT_CommFA == FALSE	8.00 fail counts out of 10.00 sample counts Function task: 500 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor 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. 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]	Test enabled by calibration 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 Induction air temperature	1.00 ==TRUE > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVld ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE > -7.00 [°C] OAT_PtEstFiltFA==TRUE > -7.00 [°C] OAT_OAT_SnsrNonEmissFA ==FALSE > -7.00 [°C]	640.00 fail counts out of 800.00 sample counts Functional 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.
					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	1.00 ==TRUE	640.00 fail counts out of 800.00 sample counts Functional task: 12.5 ms	
			Drift low check: drift of the mass air flow	< 0.75 [ratio]	MAF rationality monitoring enabled by calibration	1.00 ==TRUE		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. 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**		Diagnostic has not run in current driving cycle yet	==TRUE		
					Calibratable SCR dosing condition	IF 0.00 ==TRUE: SCR dosing condition is NH3 storage control OR intrusive NH3 storage control OR transient dosing control. IF 0.00 ==FALSE: No restrictions on SCR dosing		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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		
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side driver closed	==TRUE		
					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	> -7.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range OR Fault present on Ouside Air temperature	OR OAT_PtEstFiltFA==TRUE		
					EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature	> -7.00 [°C] AND OAT_OAT_SnsrNonEmissFA ==FALSE		
					Induction air temperature	> -7.00 [°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	AAP_AmbientAirPresDfltd		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					barometric pressure sensor	==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	> 560.00 [rpm] < 1,000.00 [rpm]		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	< 276.00 [Hz]	Test enabled by calibration Engine speed PT relay supply voltage in range Share High Side Driver closed All conditions are valid for a time	1.00 ==TRUE >= 50.00 [rpm] > 11.00 [V] ==TRUE >= 0.30 [s]	20.00 fail counts out of 25.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	1.00 ==TRUE	400.00 fail counts out of 500.00 sample counts	Type B, 2 Trips
					Engine speed	>= 50.00 [rpm]		
					PT relay supply voltage in range	> 11.00 [V]	Function task:100 ms	
					Share High Side Driver closed	==TRUE		
					All conditions arevalid 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.
O2S Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC checks if oxygen value dynamic is slower compared to a functioning sensor. Test is performed in transitions from high load to overrun. Once generic enabling conditions are met, diagnosis waits for engine operating point stability (in terms of engine speed and fuel injected). When a stable operating point is reached for a calibrated time and an overrun condition is detected, the delta between the actual O2 value (a) and the one in fresh air (b = 20.95 %) is calculated. Then two thresholds are calculated as percentage of the initial delta: O2_Thrsh1 = a + (b - a) * 0.10 O2_Thrsh2 = a + (b - a) * 0.40 Two timers are incremented to evaluate sensor dynamic while O2 moves from O2 initial value (a) to O2_Thrsh2	One of the following conditions shall be true: EWMA filtered O2 raising time from O2 initial value (a) to O2_Thrsh2 EWMA filtered O2 raising time from O2_Thrsh1 value to O2_Thrsh2	> 2.00 [s] > 0.75 [s]	**Global Enabling Condition** Engine running System voltage in range Sensor is fully operative (No SQA learning is active AND Boolean Flag used to enable SQA learning active status is TRUE) No Exhaust Brake active i.e. intake manifold pressure Enabled in combustion mode No pending or confirmed DTCs	> 11.00 [V] OXY_O2_NOx2_SDC_CrtdNotRlb == FALSE FAD_SQA_LrnET_Enbl == FALSE 1 [boolean] < 1,000.00 [kPa] refer to supporting table (**KaOXYD_b_NOx2_IncrDynChkCmbEnbl**) NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx2ChkFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO)	EWMA filtering: 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.
		and from O2_Thrsh1 to O2_Thrsh2. EWMA is applied on both timers.				EGR_PstnShtOffReqFA (MAP_SensorFA AND MAP_SensorTFTKO)		
					Additional enabling conditions for transitioning state machine from stable operation state to wait overrun state: Operating point reached and stable i.e. following conditions are met for a time	> 2.00 [s]		
					a. Engine speed in operating range	> 1,000 [rpm] < 3,000 [rpm]		
					b. Injected fuel quantity in operating range	> 10 [mm^3] < 100 [mm^3]		
					c. Fuel variation	< 3.00 [mm^3]		
					Additional enabling conditions for transitioning state machine from wait overrun state to timer evaluation state: Injected fuel quantity goes to in a time	= 0 [mm^3] < 2.50 [s]		
					Additional enabling conditions when in timer evaluation state: EGR position	< 100 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC checks if oxygen value dynamic is slower compared to a functioning sensor. Test is performed in transitions from overrun to high load. Once generic enabling conditions are met, diagnosis waits for an overrun stable condition. After that a fuel increase is detected within a calibrated time. Different timers are updated: - Timer_1 is incremented when O2Model < 19.00 [%] AND O2 > 19.00 [%] - Timer_2 is incremented when O2Model < 19.00 [%] AND O2 < 19.00 [%] - Timer_3 is incremented when O2Model < 19.00 [%] AND O2Model > 15.00 [%] - Timer_4 is incremented when O2Model < 19.00 [%] AND O2Model > 23.00 [%] - Timer_5 is incremented when O2Model < 19.00 [%] O2Model is based on	One of the following conditions shall be true: EWMA filtered Timer_1 EWMA filtered Timer_error	 > 1.40 [s] > 0.50 [-]	**Global Enabling Condition** Engine running System voltage in range Sensor is fully operative No SQA learning is active AND Boolean Flag used to enable SQA learning check is TRUE Enabled in combustion mode No pending or confirmed DTCs Sensor 1 is fully operative	> 11.00 [V] OXY_O2_NOx2_SDC_CrtdNotRlb == FALSE FAD_SQA_LrnET_Enbl == FALSE 1 [boolean] refer to supporting table **KaOXYD_b_NOx2_Decr** (**DynChkCmbEnbl**) NOX_Snsr2_NotVld OXY_NOx2SignRngChkFlt OXY_NOx2ChkFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_PstnShtOffReqFA OXY_NOx1_O2_Flt OXY_O2_NOx1_SDC_CrtdNotRlb	EWMA filtering: 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.
		Bank 1 Sensor 1 O2 measurement. Test ends when one of the following condition is verified: - O2 < 15.00 [%] - Timer_5 > 30.00 [s] - Timer_4 > 100.00 [s] After test end, all the following condition shall be verified to evaluate test validity: - Timer_4 < 100.00 [s] - O2Model < 23.00 [%] - Timer_3 < 0.00 [s] If test is valid: Timer_error = (Timer_2 - Timer_3) / Timer_3 is calculated and EWMA is applied on Timer_1 and on Time_error.			**Additional enabling conditions for transitioning state machine from stable operation state to wait fuel injection state:** Operating point reached and stable i.e. following conditions are met for a time a. Engine speed in operating range b. Injected fuel quantity **Additional enabling conditions for transitioning state machine from wait fuel injection state to timer evaluation state:** Injected fuel quantity **Additional enabling conditions when in timer evaluation state:** Injected fuel quantity within a time	 > 1.00 [s] > 600 [rpm] < 3,000 [rpm] < 1 [mm^3] > 1 [mm^3] > 30 [mm^3] < 1.50 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1	P014C	This DTC checks if oxygen value dynamic is slower compared to a functioning sensor. Test is performed in transitions from high load to overrun. Once generic enabling conditions are met, diagnosis waits for engine operating point stability (in terms of engine speed and fuel injected). When a stable operating point is reached for a calibrated time and an overrun condition is detected, the delta between the actual O2 value (a) and the one in fresh air (b = 20.95 %) is calculated. Then two thresholds are calculated as percentage of the initial delta: O2_Thrsh1 = a + (b - a) * 0.10 O2_Thrsh2 = a + (b - a) * 0.40 Two timers are incremented to evaluate sensor dynamic while O2 moves from O2 initial value (a) to O2_Thrsh2	One of the following conditions shall be true: EWMA filtered O2 raising time from O2 initial value (a) to O2_Thrsh2 EWMA filtered O2 raising time from O2_Thrsh1 value to O2_Thrsh2	> 2.00 [s] > 1.25 [s]	**Global Enabling Condition** Engine running System voltage in range Sensor is fully operative (No SQA learning is active AND Boolean Flag used to enable SQA learning active status is TRUE) No Exhaust Brake active i.e. intake manifold pressure Enabled in combustion mode No pending or confirmed DTCs	> 11.00 [V] OXY_O2_NOx1_SDC_CrtdNotRlb == FALSE FAD_SQA_LrnET_Enbl == FALSE 1 [boolean] < 1,000.00 [kPa] refer to supporting table (**KaOXYD_b_NOx1_IncrDynChkCmbEnbl**) NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngMinFlt OXY_NOx1SignRngMaxFlt OXY_NOx1ChkOvrrnFlt OXY_NOx1ChkLoadFlt FHP_InjLeakageFA	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.
		and from O2_Thrsh1 to O2_Thrsh2. EWMA is applied on both timers.				(MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_PstnShtOffReqFA (MAP_SensorFA AND MAP_SensorTFTKO)		
					Additional enabling conditions for transitioning state machine from stable operation state to wait overrun state: Operating point reached and stable i.e. following conditions are met for a time a. Engine speed in operating range b. Injected fuel quantity in operating range c. Fuel variation	 > 3.00 [s] > 1,000 [rpm] < 3,000 [rpm] > 10 [mm^3] < 100 [mm^3] < 2.00 [mm^3]		
					Additional enabling conditions for transitioning state machine from wait overrun state to timer evaluation state: Injected fuel quantity goes to in a time	 = 0 [mm^3] < 2.50 [s]		
					Additional enabling conditions when in			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					timer evaluation state: EGR position	 < 100 [%]		

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] > 75.00 [kPa] = TRUE > 65.00 [°C] > -7.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 178 failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel 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] > 75.00 [kPa] = TRUE > 65.00 [°C] > -7.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 178 failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (with lower confidence level) 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 extrapolate the results and obtain the injector behaviour in the small quantity area. This energizing time is then used for the	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	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.
		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 suspicious are tested by means of VSQA (Validation Small						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 6 Open Circuit (For 8 Cylinder Engines)	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 8 Open Circuit (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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.
Cylinder 7 Injection Timing (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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.
Injector 1 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 1 Maximum Authority Reached	P0263	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 1 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 1 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 1 saturated (positive or negative).	FAD_CB_Cyl_A_HiSaturated ==TRUE OR FAD_CB_Cyl_A_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request higher than a calibrateable threshold Engine coolant temperature higher than a calibrateable threshold No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic >= 20.00 [mm3/stroke] >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	200.00 Fails Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0265	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 2.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 2 Maximum Authority Reached	P0266	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 2 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 2 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 2 saturated (positive or negative).	FAD_CB_Cyl_D_HiSaturated ==TRUE OR FAD_CB_Cyl_D_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request higher than a calibrateable threshold Engine coolant temperature higher than a calibrateable threshold No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic >= 20.00 [mm3/stroke] >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 3 Maximum Authority Reached	P0269	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 3 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 3 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 3 saturated (positive or negative).	FAD_CB_Cyl_B_HiSaturated ==TRUE OR FAD_CB_Cyl_B_LoSaturated ==TRUE	Test enabled by calibration	1.00	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips
					No faults detected on injectors	FUL_GenericInjSysFlt		
					Fuel Injector Disable Device Control not active	FUL_InjectorDisable		
					CB enabled in closed loop	FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl		
					EOL injector codes written	FAD_EIA_DID_Written		
					No errors related to redundant calculation of EOL injector codes	FAD_EIA_RedntFlt		
					No Low fuel tank level indication	LowFuelConditionDiagnostic		
					Fuel request higher than a calibrateable threshold	>= 20.00 [mm3/stroke]		
					Engine coolant temperature higher than a calibrateable threshold	>= -20.00 [°C]		
					No faults on Engine coolant temperature sensor.	(ECT_Sensor_TFTKO AND ECT_Sensor_FA)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Efficiency Below Threshold (OBDII market only)	P026A	This monitor checks the Charge Air Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Ambient air temperature).	< 25.00 [%]	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	> 64.00 [kph]		
					Air mass flow in range	> 20.00 [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	> 1.20 [ratio]		
					Temperature difference between upstream charge air cooler and ambient temperature in range	> 36.00 [°C]		
					Environmental pressure in range	> 69.60 [kPa]		
					Environmental temperature in range	> -7.00 [°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 ambient temperature sensor	OAT_PtEstFiltFA ==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	>= 10.00 [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	< refer to supporting table (**KtFADD_V_FSA_ECM _LoThrsh**)[mm^3]	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. Power Take-Off (PTO) is not active f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged for a time i. Engine speed in operating range	> 0.00 + 5.00 [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 0 [boolean])) > 5.00 [s] > 75.00 [kPa] = TRUE > 65.00 [°C] > -7.00 [°C] different from Neutral or Parking > 10.00 [s] > 420 [rpm] < 975 [rpm]	Time counter: 200 failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					j. Engine speed gradient for a time	< 255 [rpm/25ms] > 10.00 [s]		
					k. Injected fuel quantity in operating range	> 3.0 [mm^3] < 65.0 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 64.0 [mm^3/25ms] > 0.00 [s]		
					m. Vehicle speed in operating range for a time	> -10 [kph] < 3 [kph] > 10.00 [s]		
					n. Enabled in combustion mode	refer to supporting table **KaFADD_b_FSA_ECM_** (**EnblCmbMode**)		
					o. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					p. No pending or confirmed DTCs	AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld Transmission Estimated Gear Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Quantity Higher Than Expected	P026D	An error shall be detected when the fuel adjustment value (mm^3) released by FSA is above a calibrated threshold.	Released FSA fuel correction value	> refer to supporting table (**KtFADD_V_FSA_ECM_HiThrsh**)[mm^3]	Following conditions are met for a calibrated time:	> 0.00 + 5.00 [s]	Time counter: 200 failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips
					a. System voltage in range	> 11.00 [V]		
					b. FSA correction release enabled	refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid		
					c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time	refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 0 [boolean])) > 5.00 [s]		
					d. Ambient air pressure	> 75.00 [kPa]		
					e. Power Take-Off (PTO) is not active			
					f. (OBD Coolant Enable Criteria OR Engine coolant temperature)	= TRUE > 65.00 [°C]		
					g. Ambient air temperature	> -7.00 [°C]		
					h. Gear engaged for a time	different from Neutral or Parking > 10.00 [s]		
					i. Engine speed in	> 420 [rpm]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					operating range j. Engine speed gradient for a time k. Injected fuel quantity in operating range l. Injected fuel quantity gradient for a time m. Vehicle speed in operating range for a time n. Enabled in combustion mode o. No Low fuel tank level indication p. No pending or confirmed DTCs	< 975 [rpm] < 255 [rpm/25ms] > 10.00 [s] > 3.0 [mm^3] < 65.0 [mm^3] < 64.0 [mm^3/25ms] > 0.00 [s] > -10 [kph] < 3 [kph] > 10.00 [s] refer to supporting table **KaFADD_b_FSA_ECM_** (**EnblCmbMode**) LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld Transmission Estimated Gear Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0271	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 4.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 4 Maximum Authority Reached	P0272	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 4 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 4 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 4 saturated (positive or negative).	FAD_CB_Cyl_C_HiSat urated ==TRUE OR FAD_CB_Cyl_C_LoSat urated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request higher than a calibrateable threshold Engine coolant temperature higher than a calibrateable threshold No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_E nbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnos tic >= 20.00 [mm3/stroke] >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0274	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 5.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 5 Maximum Authority Reached	P0275	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 5 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 5 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 5 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration	1.00	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips
					No faults detected on injectors	FUL_GenericInjSysFlt		
					Fuel Injector Disable Device Control not active	FUL_InjectorDisable		
					CB enabled in closed loop	FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl		
					EOL injector codes written	FAD_EIA_DID_Written		
					No errors related to redundant calculation of EOL injector codes	FAD_EIA_RedntFlt		
					No Low fuel tank level indication	LowFuelConditionDiagnostic		
					Fuel request higher than a calibrateable threshold	>= 20.00 [mm3/stroke]		
					Engine coolant temperature higher than a calibrateable threshold	>= -20.00 [°C]		
					No faults on Engine coolant temperature sensor.	(ECT_Sensor_TFTKO AND ECT_Sensor_FA)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0277	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 6.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 6 Maximum Authority Reached	P0278	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 6 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 6 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 6 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration	1.00	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips
					No faults detected on injectors	FUL_GenericInjSysFlt		
					Fuel Injector Disable Device Control not active	FUL_InjectorDisable		
					CB enabled in closed loop	FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl		
					EOL injector codes written	FAD_EIA_DID_Written		
					No errors related to redundant calculation of EOL injector codes	FAD_EIA_RedntFlt		
					No Low fuel tank level indication	LowFuelConditionDiagnostic		
					Fuel request higher than a calibrateable threshold	>= 20.00 [mm3/stroke]		
					Engine coolant temperature higher than a calibrateable threshold	>= -20.00 [°C]		
					No faults on Engine coolant temperature sensor.	(ECT_Sensor_TFTKO AND ECT_Sensor_FA)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0280	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 7.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 7 Maximum Authority Reached	P0281	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 7 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 7 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 7 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration	1.00	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips
					No faults detected on injectors	FUL_GenericInjSysFlt		
					Fuel Injector Disable Device Control not active	FUL_InjectorDisable		
					CB enabled in closed loop	FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl		
					EOL injector codes written	FAD_EIA_DID_Written		
					No errors related to redundant calculation of EOL injector codes	FAD_EIA_RedntFlt		
					No Low fuel tank level indication	LowFuelConditionDiagnostic		
					Fuel request higher than a calibrateable threshold	>= 20.00 [mm3/stroke]		
					Engine coolant temperature higher than a calibrateable threshold	>= -20.00 [°C]		
					No faults on Engine coolant temperature sensor.	(ECT_Sensor_TFTKO AND ECT_Sensor_FA)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Control Circuit Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	P0283	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 8.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 8 Maximum Authority Reached	P0284	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 8 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 8 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 8 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration	1.00	200.00 Fail Samples over 250.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips
					No faults detected on injectors	FUL_GenericInjSysFlt		
					Fuel Injector Disable Device Control not active	FUL_InjectorDisable		
					CB enabled in closed loop	FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl		
					EOL injector codes written	FAD_EIA_DID_Written		
					No errors related to redundant calculation of EOL injector codes	FAD_EIA_RedntFlt		
					No Low fuel tank level indication	LowFuelConditionDiagnostic		
					Fuel request higher than a calibrateable threshold	>= 20.00 [mm3/stroke]		
					Engine coolant temperature higher than a calibrateable threshold	>= -20.00 [°C]		
					No faults on Engine coolant temperature sensor.	(ECT_Sensor_TFTKO AND ECT_Sensor_FA)		

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Fuel Injector Offset Learning At Max Limit	P02CD	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_Max AdptDeltET[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_Max AdptDeltET[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_Max AdptDeltET[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 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_Min AdptDeltET[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 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_Max AdptDeltET[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 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 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 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_Max AdptDeltET[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 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_Min AdptDeltET[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 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 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 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 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 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.
Diesel Intake Air Flow Control Circuit	P02E0	This monitor checks if the Throttle commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from wide open (default position)	== 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.
Diesel Intake Air Flow Control Circuit High	P02E3	This monitor checks if the Throttle commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 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.
Diesel Intake Air Flow Stuck Open	P02E4	This monitor checks if the Throttle valve got mechanically stuck in a position more open than what is required by the control	position tracking error (setpoint position - measured position) < negative threshold AND valve duty cycle < negative threshold	< -16.00 [%] AND < -34.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. No faults present on Throttle position sensor, Throttle valve, Throttle position deviation	== 1.00 > 5.00 [V] TPS_PstnShtOffReq == FALSE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms after additional 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 Stuck Closed	P02E5	This monitor checks if the Throttle valve got mechanically stuck in a position more closed than what is required by the control	position tracking error (setpoint position - measured position) > positive threshold AND valve duty cycle > positive threshold	> 16.00 [%] AND > 34.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. Position control in closed loop (no faults present on Throttle position sensor, Throttle valve, Throttle position deviation)	== 1.00 > 5.00 [V] TPS_PstnShtOffReq == FALSE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 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 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 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 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 Current Range/ Performance	P02EB	This monitor checks if an excessive current flows through the Throttle DC-Motor (e.g. shunt circuit between load, Throttle DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle DC Motor current range/performance H-Bridge driver is ON	== 1.00 > 11.00 [V] TPS_MtrCurrLimTFTKO == FALSE	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.
Cylinder 1 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02EE	This DTC detects an Injector fault or ECU fault that causes injector 1 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 1 provided by HWIO	> 12.00 [us] OR < 3.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02EF	This DTC detects an Injector fault or ECU fault that causes injector 2 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 2 provided by HWIO	> 12.00 [us] OR < 3.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02F0	This DTC detects an Injector fault or ECU fault that causes injector 3 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 3 provided by HWIO	> 12.00 [us] OR < 3.00 [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 No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02F1	This DTC detects an Injector fault or ECU fault that causes injector 4 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 4 provided by HWIO	> 12.00 [us] OR < 3.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02F2	This DTC detects an Injector fault or ECU fault that causes injector 5 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 5 provided by HWIO	> 12.00 [us] OR < 3.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02F3	This DTC detects an Injector fault or ECU fault that causes injector 6 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 6 provided by HWIO	> 12.00 [us] OR < 3.00 [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 No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02F4	This DTC detects an Injector fault or ECU fault that causes injector 7 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 7 provided by HWIO	> 12.00 [us] OR < 3.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injector Circuit Range/ Performance (For 8 Cylinder Engines)	P02F5	This DTC detects an Injector fault or ECU fault that causes injector 8 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 8 provided by HWIO	> 12.00 [us] OR < 3.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInErrTFTKO == TRUE) -	50 failures out of 70 samples 1 sample every engine cycle Continuous	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 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 [Ohm]	Glow Lamp is present; Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Diagnostic system is not disabled;	1.00 [boolean] 1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples. * Ground short monitoring is implemented in HWIO level wich means no further debouncing is needed in case of short to ground Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 [Ohm]	Glow Lamp is present; Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Diagnostic system is not disabled;	1.00 [boolean] 1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeDRER_DiagSystemDsbl = FALSE;	5.00 fail samples over 8.00 samples. Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 [kOhm] Ropmin = 10 [Ohm]	Glow Lamp is present; Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Diagnostic system is not disabled;	1.00 [boolean] 1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples. * Open load monitoring is implemented in HWIO level wich means no further debouncing is needed in case of open load Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Circuit	P0403	This monitor checks if the HP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from fully closed (default position)	== 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.
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 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 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor checks if the HP EGR valve got mechanically stuck in a position more open than what is required by the control	position tracking error (setpoint position - measured position) < negative threshold AND valve duty cycle < negative threshold	< -16.00 [%] AND < -29.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, position deviation	== 1.00 > 5.00 [V] EGR_PstnShtOffReq == FALSE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Stuck Closed	P042F	This monitor checks if the HP EGR valve got mechanically stuck in a position more closed than what is required by the control	position tracking error (setpoint position - measured position) > positive threshold AND valve duty cycle > positive threshold	> 16.00 [%] AND > 29.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, position deviation	== 1.00 > 5.00 [V] EGR_PstnShtOffReq== FALSE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms after 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.
Exhaust Gas Recirculation Control Circuit High Voltage	P0490	This monitor checks if the HP EGR commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	== 1.00	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 ON			

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 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 Circuit Low Bank 1 Sensor 1	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 Circuit High Bank 1 Sensor 1	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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode case **SCR Temp1:** (transmission in Gear: Fuel quantity of the torque forming pulses transmission in Park/ Neutral: Fuel quantity of the torque forming pulses) case **SCR Temp2** (transmission in Gear: Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleT1_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT1_PN** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT2_G** [mm^3] depending on engine speed and engine coolant	**For enabling the monitor, all the following conditions must be satisfied continuously for more than** Test enabled by calibration and current gear and depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark (CeFULR_e_InGear: transmission CeFULR_e_NeutralPark: transmission CeFULR_e_InGearNeutralPark: 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(511.00 , 511.00 + 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 **SCR Temp3** (transmission in Gear: Fuel quantity of the torque forming pulses transmission in Park/ Neutral: Fuel quantity of the torque forming pulses) case **HC unloading driving and park/neutral**	temperature < 0.5* **P054E_IFM_MinFuelIdleT2_PN** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT3_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT3_PN** [mm^3] depending on engine speed and engine coolant temperature	and (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 No active DTC's:	== TRUE > hysteresis(-21.00 , -20.00) [°C] > hysteresis(-8.00 , -7.00) [°C] < 3.00 [kph] **P054F_IFM_CombModesEnbl** <= 0.05 [%] - == 0 [Boolean] >= 11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(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:** (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_MinFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5*	Depending on the **OAT Source Calibration =** CeOATR_e_ECM_OAT_Sensor (CeOATR_e_NonOBD_NonECM_NonVICM: default:)	OAT_OAT_SnsrNonEmissFA OAT_PtEstFiltFA CrankSensor_TFTKO ECT_Sensor_FA Transmission Estimated Gear Validity VehicleSpeedSensor_FA AcceleratorPedalFailure (FUL_GenericInjSysFA AND FUL_GenericInjSysFlt)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			)	**P054E_IFM_MinFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature				

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		**For enabling the monitor, all the following conditions must be satisfied continuously for more than**	5.00 [s]	200.00 failures out of 255.00 samples 1 sample every cylinder firing event	Type B, 2 Trips
			case **SCR Temp1**: { transmission in Gear: Fuel quantity of the torque forming pulses	> 1.5* **P054F_IFM_MaxFuelIdleT1_G** [mm^3] depending on engine speed and engine coolant temperature	Test enabled by calibration	1.00 [Boolean]		
					and current gear	unchanged		
			transmission in Park/ Neutral: Fuel quantity of the torque forming pulses	> 1.5* **P054F_IFM_MaxFuelIdleT1_PN** [mm^3] depending on engine speed and engine coolant temperature	and depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark { CeFULR_e_InGear: transmission	in gear		
					CeFULR_e_NeutralPark: transmission	in park/neutral		
			}		CeFULR_e_InGearNeutralPark: transmission }	in gear and in park neutral		
			case **SCR Temp2** { transmission in Gear: Fuel quantity of the torque forming pulses	> 1.5* **P054F_IFM_MaxFuelIdleT2_G** [mm^3] depending on engine speed and engine coolant temperature	and engine speed	> hysteresis(511.00 , 511.00 + 0.00) [rpm]		
					and engine speed	< hysteresis(1,560.00 , 1,560.00 + 0.00) [rpm]		
					and			

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
			SCR Temp3
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive ||
				> 1.5* **P054F_IFM_MaxFuelIdleT2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleT3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleT3_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
					No active DTC's:
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-8.00 , -7.00) [°C]
						
						< 3.00 [kph]
						
						P054F_IFM_CombModesEnbl
						
						<= 0.05 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]		

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

			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:
			{
			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_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
				
				> 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
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						(FUL_GenericInjSysFA AND FUL_GenericInjSysFlt)		

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

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 (For 8 Cylinder Engines)	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 [V]) > 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.
NOx Sensor Slow Response Bank 1 Sensor 2	P1004	This diagnosis verifies the sensitivity to NOx concentration variations of Downstream NOx sensor	Check for Downstream NOx sensor slow response failure caused by PM poisoning or not specified contaminant poisoning on the sensor diffusion layer. A failure is detected if mean value of NOx2 absolute derivative (Sum_of_NOx2_raw_absolute_derivative_samples/ Observation_samples)	 <= -1,000.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Run crank active Powertrain relay voltage NOx Sensor Bus relay is commanded ON Upstream NOx Sensor is present in the exhaust Downstream NOx Sensor is present in the exhaust Upstream 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 Upstream sensor supply in range Upstream sensor dewpoint is reached Downstream sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	**NOX_S2_SlowRespChkCmbEnbl** TRUE TRUE TRUE > 11.00 V TRUE TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.8V TRUE < 0.03 % > - 0.03 %	The monitor runs after the integral of upstream NOx sensor absolute derivative exceeds 100.00 ppm. Once exceeded this threshold, the diagnostic provides a result. Abort conditions for the monitor are when integral of upstream SCR temperature absolute derivative exceeds 1,000.00 °C OR observation samples reach 1,000.00 counts. 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.
					b) condition a) is fulfilled for time	> 10.00 sec		
					Downstream sensor supply in range	> 10.8V		
					Downstream sensor dewpoint is reached	TRUE		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative c) condition b) is fulfilled for a time	 < 5.00 mm^3/s > 0.00 s		
					Fuel request is within a range	< 140.00 mm^3 > 0.00 mm^3		
					Engine speed is within a range	< 3,100.00 rpm > 580.00 rpm		
					Oxygen concentration from NOx1 is within a calibrate-able range	< 22.00 % > 0.00 %		
					Upstream SCR temperature is steady state: a) Upstream SCR temperature derivative b) conditions a) is fulfilled for a time	 < 100.00 °C/s > 0.00 s		
					Upstream SCR temperature is within a range	< 850.00 °C > -7.00 °C		
					Time after DPF regen modes	> 0.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow is within a range	< 450.00 g/s > 0.00 g/s		
					Intake manifold absolute pressure	< 1,000.00 kPa		
					SCR NH3 quantity stored within a range	< 4.00 g > 0.00 g		
					No fault on SCR chemical model inputs	SCR_ChemicalMdlFlt ==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngLo Flt ==FALSE		
					No out of range high failure on NOx1 sensor	NOX_NOx1_OutOfRngHi Flt ==FALSE		
					No failure on NOx1 sensor signal plausibility	NOX_NOx1_NOxPlausFlt ==FALSE		
					No failure on NOx1 sensor signal dynamic	NOX_NOx1_DynChkFlt ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No failure on NOx1 offset monitoring	NOX_NOx1_OfstMontrFlt ==FALSE		
					No electrical failure on NOx2 sensor	NOX_Snsr2_FltSt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 sensor signal plausibility	NOX_NOx2_SelfDiagFlt ==FALSE		
					No failure on NOx2 sensor signal dynamic	NOX_NOx2_DynChkFlt ==FALSE		
					No failure on NOx2 CAN communication	CAN_LostComm_FltN_Bu sB_NOxSnsr_B ==FALSE		
					No failure on NOx1 offset monitoring	NOX_NOx2_OfstMontrFlt ==FALSE		
					No fault on O2 read from upstream NOx sensor	OXY_NOx1_O2_Flt ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					No failure on upstream SCR temperature	EGT_TempSCR_UpFlt ==FALSE		
					No failure on Upstream SCR Exhaust Flow Signal	EXF_TotExhSCR_UpFlt ==FALSE		

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 EOL during the learning procedure is plausibile	physical travel measured at EOL < low threshold OR physical travel measured at EOL > high threshold	< 217.00 [counts] OR > 285.00 [counts]	Test enabled by calibration EOL 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.
Reductant Pump Driver High Temperature	P103F	This diagnosis verifies that the Motor Mosfet Driver Temperature is too High	Motor Mosfet Driver Temperature too High Error status == FAULT	VeSCRR_e_PmpDrvrHiTemp == FAULT	Test enabled by calibration	1.00 [Boolean]	40.00 failures out of 50.00 samples Time basis = 100ms/sample	Type A, 1 Trips
					Key on (OR engine running)			
					Engine is not cranking			
					Battery voltage	> 11.00 [V]		
					No loss of CAN communication	U010E, Lost Communication With Reductant Control Module		
					Motor Mosfet Driver Temperature too High Error status provided by DEF control module different from INDETERMINATE			

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor-Invalid Range	P1050	This diagnosis verifies that the DEF level sensor raw signal is not within plausible range	DEF level sensor raw value is not within calibrated range (for discrete level sensor, each discrete level has its plausible range) Supply voltage parcentage is outside of the following ranges:	(2.00 ; 5.50) [%] (17.30 ; 22.00) [%] (32.90 ; 38.80) [%] (63.10 ; 69.40) [%]	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN communication No electrical faults on DEF level sensor Discrete Level sensor used	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFLS_ElecFltSt == FALSE CeSCRI_e_DEF_LvlSnsr Discrete == CeSCRI_e_DEF_LvlSnsr Discrete	40.00 failures out of 50.00 samples Time basis = 100ms/sample	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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_LrnDelt** OR < SQA Rail Pressure Set-point - **KaFADC_p_SQA_LrnDelt**	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.	> 30.00	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 1.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>= 0.10 [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	< 7.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	> 1,020,852.00 [ohm]	Test enabled by calibration	== 1.00	50.00 fail counter over 63.00 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	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Not Plausible Bank 1 Sensor 1	P113B	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 1 (EGT1) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available system temperature sensors (exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratable and the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT1 temperature|	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTCs 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 > 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 Not Plausible Bank 1 Sensor 2	P113C	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 2 (EGT2) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT2 temperature| See the Description Tab for Reference Temperature, (EGT_Avg) definition.	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTCs 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 > 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 Not Plausible Bank 1 Sensor 3 DOC+DPF +SCR	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 DTCs 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 > 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 4 Not Plausible	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 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 > 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 5 Not Plausible DOC1+SCR +DOC2 +DPF	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 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 > 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 (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit Low Voltage	P115F	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit High Voltage	P1160	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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 (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit	P116D	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Reference pin(M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit Low Voltage	P116E	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit High Voltage	P116F	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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 Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time No electrical fault detected on Soot Sensor If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass Ambient Air pressure Ambient air pressure sensor not faulty Time since Soot Sensor heating off when the sensor temperature has	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 9.00 V > 0.10 s NOT(SOT_EleclFault) TPTKO on P1477 TPTKO on P1478 >75.00 KPa AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 300.00 s	No time debounce	Type B, 2 Trips

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

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 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 -100.00 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 EGT_ExhGas1_CktTFTKO and EGT_ExhGas2_QckChgFA and EGT_ExhGas1_QckChgTFTKO	6.00 fail samples out of 8.00 Each sample is 2.00 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 No faults on the consumed EGT sensors and Time since last DPF regeneration and Time after warm up and Continuos engine run time and Fuel Rate and Engine Speed within bounds, determined by calibration map and Model Temperature Rate of change limited to: over a time period of:	>= 0.00 seconds >= 0.00 seconds >= 60.00 seconds **EGT1 DynChk EngPtEnbl** 8.00 degC CeEGTR_e_IndexMax5000ms 2.00 seconds		

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

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 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 EGT22 - 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	1.00 > 11.00 Volts == FALSE > 0.00 seconds > -40.00 degC < 900.00 degC ==TRUE EGT_ExhGas2_CktFA and EGT_ExhGas2_CktTFTKO and EGT_ExhGas2_QckChgFA	6.00 fail samples out of 8.00 Each sample is 2.00 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 No faults on the consumed EGT sensors and Time since last DPF regeneration and Time afert warm up and Continuos engine run time and Fuel Rate and Engine Speed within bounds, determined by calibration map	and EGT_ExhGas2_QckChgTFTKO and EGT_ExhGas2_QckChgFA >= 0.00 seconds >= 0.00 seconds >= 0.00 seconds **EGT2 DynChk EngPtEnbl** < 4.00 degC CeEGTR_e_IndexMax5000ms		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
						2.00 seconds		
					Model Temperature Rate of change limited to:			
					over a time period of:			
					Enabling delay time			

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 EGT_ExhGas3_CktFA and EGT_ExhGas3_CktTFTKO and	6.00 fail samples out of 8.00 Each sample is 2.00 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 Time since last DPF regeneration and Time afert warm up and Continuos engine run time and	EGT_ExhGas3_QckChgFA and EGT_ExhGas3_QckChgTFTKO and EGT_ExhGas3_StkFA and EGT_ExhGas3_StkTFTKO >= 0.00 seconds >= 0.00 seconds >= 120.00 seconds **EGT3 DynChk EngPtEnbl** < 4.00 degC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel Rate and Engine Speed within bounds, determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	CeEGTR_e_IndexMax5000ms 2.00 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 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 EGT_ExhGas4_CktFA and EGT_ExhGas4_CktTFTKO and EGT_ExhGas4_QckChgFA	6.00 fail samples out of 8.00 Each sample is 2.00 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	and EGT_ExhGas4_QckChgTFTKO and EGT_ExhGas4_StkFA and EGT_ExhGas4_StkTFTKO		
						>= 0.00 seconds		
						>= 0.00 seconds		
					Time since last DPF regeneration and	>= 0.00 seconds		
					Time afert warm up and	**EGT4 DynChk EngPtEnbl**		
					Continuos engine run time			
					and	< 4.00 degC		
					Fuel Rate and Engine Speed within bounds,			

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	CeEGTR_e_IndexMax5000ms 2.00 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 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 EGT_ExhGas5_CktFA and EGT_ExhGas5_CktTFTK O and EGT_ExhGas5_QckChgF A	6.00 fail samples out of 8.00 Each sample is 2.00 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_ExhGas5_QckChgTFTKO and EGT_ExhGas5_StkFA and EGT_ExhGas5_StkTFTKO		
					and			
						>= 0.00 seconds		
						>= 0.00 seconds		
					Time since last DPF regeneration			
					and	>= 0.00 seconds		
					Time afert warm up			
					and	**EGT5 DynChk EngPtEnbl**		
					Continuos engine run time			
					and	< 4.00 degC		
					Fuel Rate and Engine Speed within bounds, determined by calibration map	CeEGTR_e_IndexMax5000ms		

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: over a time period of: Enabling delay time	2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit	P119A	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 NOx-related measurement pin (M2)	open circuit on M2	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit Low Voltage	P119B	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 NOx-related measurement pin (M2)	groundshort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit High Voltage	P119C	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 NOx-related measurement pin (M2)	powershort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit	P119D	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	NOx sensor is Gen3.0	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	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	> 5.80 [%] < -3.80 [%]	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 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit Low Voltage	P11BF	This diagnosis verifies Downstream NOx gen3 sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit High Voltage	P11C0	This diagnosis verifies Downstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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	TRUE	Time counter: 20 fails out of 40 samples	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE	Task=25ms	
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.8V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Ground Circuit High Voltage	P11C6	This diagnosis verifies Upstream NOx gen3 sensor heater ground circuit Short to Battery	Check if there is short circuit to power supply on NOx Sensor 1 heater reference pin (H-)	powershort on H-	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Ground Circuit	P11C7	This diagnosis verifies Downstream NOx gen3 sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 2 heater reference pin (H-)	open circuit on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range	TRUE > 11.00 V TRUE FALSE > 10.8V	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Ground Circuit High Voltage	P11C8	This diagnosis verifies Dowmstream NOx gen3 sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 2 heater reference pin (H-)	powershort on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	This diagnosis verifies the plausibility of Upstream NOx sensor signal	Check if (Upstream NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -40 % OR > 100.00 %	Engine is running	TRUE	Test per trip: 1	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V	If Fast Initial Response EWMA is active then 0 test per trip are allowed	
					No failure on any NOx model inputs	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					Injection small quantity adjustment (SQA) learning is not active	FAD_SQA_LrnET_Enbl ==FALSE	If Fast Initial Response EWMA is active then 0 test per trip are allowed	
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_ElecFA ==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 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	ECT_Sensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor	==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					Modeled Upstream NOx concentration	> 100 ppm		
					Steady state detection: a) Modeled Upstream NOx concentration step at 100 ms. b) condition a) is fulfilled for time	 < 5 ppm > 5.00 sec		
					Ambient air pressure	> 70 kPa < 200 kPa		
					Outside air temperature	> -7 °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: > 17.00 mm^3 < 50.00 mm^3 For other combustion modes: > 15 mm^3		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						< 30 mm^3		
					Engine speed	For normal combustion mode: > 1,200 rpm < 3,200 rpm For other combustion modes: > 1,200 rpm < 3,200 rpm		
					Engine coolant temperature	> 70 °C < 128 °C		
					Sensor dewpoint is reached	TRUE		
					Diagnostic test results during EWMA FIR mode	< 0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit	P11D0	This diagnosis verifies Dowstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Linear pin (P-)	open circuit on P-	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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)	< -25.00 ppm > 100.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Run crank active 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	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE TRUE > 11.00 V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.8V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 300.00 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 400.00 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 1.00 sampling windows (each one made up of 1.00 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	< 3,500.00 rpm > 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	 < 2.00 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		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx1 sensor signal dynamic	NOX_NOx1_DynChkFlt ==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 after injection release	FUL_A_Released ==FALSE		
					No failure on Upstream SCR temperature sensor	NOX_Snsr1_TempFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2	P11D5	This diagnosis verifies if Downstream NOx sensor raw signal is affected by an offset	Check if NOx2 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window)	 < -25.00 ppm > 250.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Downstream NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a	**NOX_S2_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.8V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 300.00 g/s > 0.00 g/s < 500.00 mg/s > -1.00 mg/s < 3,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 400.00 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 1.00 sampling windows (each one made up of 1.00 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		
					Downstream NOx sensor temperature is within a range	< 325.00 °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	 < 2.00 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		
					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 sensor signal plausibility	NOX_NOx2_SelfDiagFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx2 sensor signal dynamic	NOX_NOx2_DynChkFlt ==FALSE		
					No failure on NOx2 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					No failure on air control system	AIC_AirShtOffReq ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					Upstream SCR temperature is steady state: a) Upstream SCR temperature derivative within a range b) conditions a) is fulfilled for a time	< 15.00 °C/s > -50.00 °C/s > 60.00 s		
					No after injection release	FUL_A_Released ==FALSE		
					No failure on Downstream SCR temperature sensor	NOX_Snsr2_TempFlt ==FALSE		
					No failure on upstream	EGT_TempSCR_UpFlt		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit	P11D8	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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 (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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 (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Current Range/ Performance - Bank 1 Sensor 1	P11DB	This diagnosis verifies that Upstream NOx sensor embedded current control circuit status is healthy	Check if the NOx1 sensor embedded stability criteria of Nox/Lambda current control circuit are violated	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for NOx 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	Powertrain relay voltage	> 11.00 V	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.8V		
					Engine is not cranking	TRUE		
					Sensor dewpoint is reached	TRUE		
					Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time	< 0.03 % >- 0.03 % > 10.00 sec		
					Engine is running	TRUE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_FltSt ==FALSE		
			NOx stability flag: (OFF_Time/TOTAL_time)	> 1 %	Combustion mode dependent enabling flag	**NOX_S1_StBitChkEnblCmbMode**		
			Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	> 1 %	Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	<= 35.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec		

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 NOx 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 > 10.8V 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 (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	== 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.
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 B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			

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 B, 2 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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 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.
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	== 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.
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 B, 2 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		

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 System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	106.00 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.
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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Motor Overtemperature	P1424	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 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.
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 B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor A Circuit Low	P142C	This diagnosis detects a short circuit to ground on soot sensor control unit temperature 1 signal line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 1 Circuit Signal	< 0,3 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor A Circuit High	P142D	This diagnosis detects an open circuit on soot sensor control unit temperature 1 signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 1 Circuit Signal	> 4,97 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor B Circuit Low	P142E	This diagnosis detects a short circuit to ground on soot sensor control unit temperature 2 signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 2 Circuit Signal	< 0,03V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Sensor B Circuit High	P142F	This diagnosis detects an open circuit on soot sensor control unit temperature 2 signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Control Unit Temperature 2 Circuit Signal	 > 4,7 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Signal Message Counter Incorrect	P1436	This diagnosis detects a soot sensor control unit failure	Soot Sensor Control Unit Information Alive Rolling Counter OR Soot Sensor Control Unit Information Checksum is failing		Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine not in cranking mode Fault not detected on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 System out of the cranking phase PT relay supply voltage in range	== 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.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too Low DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P144E	DPF Control Temperature Deviation diagnostic monitorsthe exhaust gas temperature Downstream the 1st ccDOC (EGT2) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic	**LowTemperature monitoring (Positive Deviation):** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	 > 100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on DOC downstream temperature sensor Combustion mode different from LNT Desox Lean and LNT Engine Protection Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	1.00 [Boolean] DPF_DPF_St== Warm_Up EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF _TempDeviation** [Boolean] > 0.00 [kph]	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.
						< 250.00 [g/s]		
					Vehicle speed	> 8.00 [g/s]		
					Exhaust mass flow AND	< 150.00 [g/s]		
						< 30.00 [sec]		
					Exhaust mass flow			
						> 20.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)			
					The system shall not be in cut off for a calibratable timer.			
					All the above enabling conditions met for at least a calibratable timer			
			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	> 100.00 degC	Regeneration state in	DPF_DPF_St== Steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			setpoint - ccDOC Downstream sensor reading (EGT2)		Steday state DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on ccDOC Downstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Vehicle speed Exhaust mass flow AND	EGT_DsblCL == Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF_TempDeviation** [Boolean] > 0.00 [kph] < 250.00 [g/s] > 8.00 [g/s] < 150.00 [g/s] < 30.00 [sec]	Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow	> 15.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)			
					The system shall not be in cut off for a calibratable time			
					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.
Particulate Matter Sensor Electrode Supply Circuit Open	P1474	This diagnosis detects an open circuit on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electode supply voltage signal (i.e. measured ADC voltage for electrode current)	< 0.3 V	Soot Sensor Control Unit conditions: Battery Voltage Soot Sensor Electrode Supply Voltage ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 9 V = 45,6V > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 6.00 failures out of 12.00 samples 100 ms/sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Electrode Supply Circuit High	P1476	This diagnosis detects a short to power on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode voltage signal (measured ADC voltage for electrode current)	> 4.7 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 6.00 failures out of 12.00 samples 100 ms/sample	Type B, 2 Trips
			Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	> 2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage Disabled ECU conditions: Ignition voltage in range	 >	Time counter: 6.00 failures out of 12.00 samples 100 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					Key is turned on			
					Engine not in cranking mode			
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(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 <= K <= 0.25	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFault) NOT(P24D0)	Time counter: 30.00 failures out of 60.00 samples 1000 ms/sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Protection Tube Performance	P1488	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	Integrated derivative of corrected volumetric flow AND Integrated derivative of effective soot sensor heater voltage (i,e, cumulated heater voltage change)	> 5,000.00 < 5.00 V	Key is turned on Ignition voltage in range Engine in running mode Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor No fault on exhaust gas pressure estimation at sensor location No fault on exhaust gas temperature estimation at sensor location No fault on gas mass flow estimation at sensor location Soot Sensor in protection heating operating state Derivative in volumetric flow is	 > 11.00 NOT(SBR_RlyFA) (U02A3) NOT(P24D0) NOT(SOT_EleclFault) SOT_ExhPresSootSnsrVld SOT_ExhTempSootSnsrVld SOT_TotExhSootSnsrVld 2.00 < d2V < 300.00 > = 1.00 s	No debounce time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	> 22.00		
					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 is	> 0.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off) is	0.00 < T < 300.00 °C		
					Exhaust gas temperature at Soot Sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit A Low (SENT position sensor)	P16A0	This monitor checks if the Throttle SENT position sensor protocol is out of range low	HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status	> 6.25 [ms] AND == LOW	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.
Sensor/ Switch Communication Circuit A High (SENT position sensor)	P16A1	This monitor checks if the Throttle SENT position sensor protocol is out of range high	HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status	> 6.25 [ms] AND == HIGH	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.
Sensor/ Switch Communication Circuit A Performance (SENT position sensor)	P16A2	This monitor checks if the Throttle SENT position sensor protocol has performance problems	HWIO message fault on Throttle SENT position == TRUE OR (number of Throttle SENT position counters has been updated AND HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE))	message error == TRUE OR (------------- AND > 6.25 [ms])	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range	== 1.00 > 11.00 [V] TPS_SENT_OOR_Flt == FALSE	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.
Diesel Particulate Filter Efficiency Below Threshold Bank 1	P2002	This diagnosis detects a cracked Diesel Particulate FIlter	{The level of soot calculated by a prediction model is for certain time OR soot sensor current is for certain time} AND predicted soot sensor level averaged over a number of different diagnostic runs (>= 1 runs) is	>= 1.00 (0= no soot) > 1.50 s >= 12.00 µA >= 1.50 s < 1.00	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) NOT (DPF_TempDPF_DwnFlt) SOT_TotExhSootSnsrVld NOT (SOT_PM_DPF_UpFlt) > -7.00 °C < 20.00	The number of runs to perform the diagnostic test >= 1.00	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					measurement phase, Duration of Autostop phase During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is	< 200.00 s <= 1,000.00		

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)(EGT4)	P200C	This diagnosis verify if the exahust gas temperature on DPF Upstream (EGT_DPF_Up) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Upstream Exhaust gas temperature	**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 Upstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_UpFlt [Boolean]	**In Normal mode**: 60.00 fail samples out of 75.00 samples **In Regeneration mode:** 60.00 fail samples out of 75.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: DPF Upstream Exhaust gas temperature	> 900.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on DPF Upstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_UpFlt [Boolean]	60.00 fail samples out of 75.00 samples Function task: 100ms	

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:** 100.00 fail samples out of 125.00 samples **In Regeneration mode :** 100.00 fail samples out of 125.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: Exhaust gas temperature on ccDOC Downstream	> 850.00	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	100.00 fail samples out of 125.00 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 Circuit Low Bank 1 Sensor 2	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 Circuit High Bank 1 Sensor 2	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 B, 2 Trips

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

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Performance	P205B	This diagnosis verifies that the DEF tank temperature sensor is affected by rationality fault (gain or offset)	Difference between temperature sensor signal and system average temperature (provided by the Exhaust Gas Temperature sensors) is greater than a calibrated threshold	> 35.00	Test enabled by calibration	1.00 == TRUE	2.00 failures out of 2.00 samples Time basis = 500ms	Type A, 1 Trips
					Battery voltage	> 11.00 [V]		
					Key on (OR engine running)			
					No loss of CAN comunication	U010E, Lost Communication With Reductant Control Module (SCR)		
					Average temperature calculated in EGTR is available			
					Engine speed = 0 rpm			
					No electrical fault on DEF temperature sensor	SCR_DEFTS_FA == FALSE		
					Time elapsed since last key off	> 28,800.00		
					Tank Refill is not detected			
					DEF temperature sensor signal is not outside the DEF freezing temperature range (with tollerance).	[(-90.00 - 1.00) ; (-90.00 + 1.00)] [°C]		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF temperature sensor Self Correlated diagnostic	P205E	This diagnosis verifies that the DEF temperature sensor signal has not a plausible time evolution	DEF temperature sensor signal time evolution not plausible (intermittent signal)		Test enabled by calibration Run Crank active Run Crank in range No loss of CAN comunication No electrical fault on tank Temperature sensor	1.00 U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTS_ElecFltSt == FALSE	8.00 failures out of 10.00 samples Time basis = 500ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Intermittent Bank 1 Sensor 1	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 Circuit Intermittent Bank 1 Sensor 2	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.
Reductant Pump Control Circuit	P208A	This diagnosis verifies that the DEF pump phases are open	Motor Pump Phase Open Error status provided by DEF control module == FAULT		Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Motor Pump Phase Open Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	20.00 failures out of 25.00 samples Time basis = 100ms	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF tank heater plausibility check	P20BA	This diagnosis verify thet the DEF tank heater resistance value is not plausible	DEF tank heater resistance not plausible (too different from the nominal one) DEF tank heater resistance outside the range	 (1.05 ; 1.93) [ohm]	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No SCR Power Module CAN loss of communication No electrical faults affecting the tank heater Heating strategy is requesting the Heater to be activated Time passed since heater activation > threshold Tank heater supply under-voltage fault not present	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTH_ElecFltSt == FALSE > 1.00 [s] SCR_TankHeatSplyVoltFA == FALSE	10.00 failures out of 12.00 samples Time basis = 500ms	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF line heater plausibility check	P20BE	This diagnosis verify thet the DEF line heater resistance value is not plausible	DEF line heater resistance value not plausible (too different from the nominal one)	(Heater supply voltage/ Heater Current) > 7.82 OR (Heater supply voltage/ Heater Current) < 5.01	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication No electrical faults affecting the line heater Heating strategy is requesting the Heater to be activated Time since heater activation > threshold Line heater supply under-voltage fault not present	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFLH_ElecFltSt ==FALSE VeSCRR_b_HeatB_On == TRUE > 1.00 SCR_LineHeatSplyVoltFA == FALSE	10.00 failures out of 12.00 samples Time basis = 500ms	

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

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

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 time 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.
Reductant Pressure Too Low	P20E8	This diagnosis verifies that the DEF pressure is lower than the target value set by the control	(Test 1) Too attemps of pressure build up (Test 2) DEF pressure setpoint - DEF measured pressure > calibrateable threshold	(Test 1) > 2.00 (Test 2) > 166.00	Test enabled by calibration Battery voltage Key on (OR engine running) Defrost complete Motor pump rotor stall fault not present No fault on DEF pressure sensor No fault on PWM command No electrical fault on DEF pump No electrical fault on DEF dosing valve Motor pump is no more green (some build pressure attempts already performed since the beginning of vehicle life). Time elapsed from the first build up attempt	1.00 > 11.00 [V] SCR_PmpRtrStlFA == FALSE SCR_DEFPS_FA== FALSE SCR_DEF_PumpCmdFA == FALSE SCR_DEFPM_FA == FALSE SCR_DEFMV_FA == FALSE > 1,200.00 [s]	8.00 failures out of 10.00 samples Time basis = 500ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Too High	P20E9	This diagnosis verifies that the DEF pressure in the dosing line is too high	Difference between "DEF line pressure" and "DEF line pressure set point" > Threshold AND Pump rotor speed < Threshold	> 150.00 < 3,200.00	Test enabled by calibration Battery voltage Battery voltage Key on (OR engine running) DEF pressure sensor not in fault PWM_pump_command not in fault DEF pressure control status equal to “Closed loop control” DEF motor pump not in fault Pump motor speed signal valid on CAN	1.00 > 11.00 [V] SCR_DEFPS_FA== FALSE SCR_DEF_PumpCmdFA == FALSE VeSCRC_e_SCR_PresState == CeSCRC_e_PresCntrlCLC SCR_DEFPM_FA	100.00 failures out of 125.00 samples Time basis = 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 1 Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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.
Reductant Pump A Current Too High	P214E	This diagnosis verifies that the DEF pump current flow is too high	Motor High Current Error status provided by DEF control module == FAULT OR Motor Current Limit Error status provided by DEF control module == FAULT		Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication Motor High Current Error status provided by DEF control module different from indeterminate	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR)	20.00 failures out of 25.00 samples OR 20.00 failures out of 25.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2 Low Voltage (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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 (For 8 Cylinder Engines)	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.
SCRPM supply under-voltage monitoring	P21CB	This diagnosis verifues that the SCRPM supply voltage is under the threshold of correct functioning	SCRPM supply under-voltage (System Battery Voltage - SCRPM Supply Voltage value)	 > 3.00	Test enabled by calibration Powertrain relay in range Run Crank Active Cranking phase excluded No SCR Power Module CAN loss of communication	1.00 U010E, Lost Communication With Reductant Control Module (SCR)	40.00 failures out of 50.00 samples Time basis = 100ms	

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 Engine is running No electrical failure on NOx1 sensor Combustion mode dependent enabling flag	> -1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A > 10.8V TRUE NOX_NOx1_StBitChkFlt ==FALSE TRUE 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:		Powertrain relay voltage	> 11.00 V	Time counter: 200 fails out of 250 samples	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
			NOx raw read	> 2,500 ppm	No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A	Task=25ms	
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					Engine is running	TRUE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_ElecFA ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S1_OutRngMaxCmbMode**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit	P2205	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Supply pin (H+)	open circuit on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range	TRUE > 11.00 V TRUE FALSE > 10.8V	Time counter: 20 fails out of 40 samples Task=25ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0	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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

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	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	> 10.8V		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	This diagnosis verifies if the supply voltage of the Upstream Nox sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage < 10.8 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	TRUE > 11.00 V TRUE TRUE > 0 sec FALSE	Time counter: 16 fails out of 30 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 < 10.8 V	NOx sensor is Gen3.0	TRUE	Time counter: 16 fails out of 30 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		

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	> 10.8V		
					Sensor dewpoint is reached	TRUE		
					(Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit High Voltage	P2211	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply NOx Sensor 1 Heater Sense pin (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Filter Deteriorated/ Missing Substrate Bank 1	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 > 2.00 [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 < 700.00 [DegC] for > 25.00 [s]		
					Engine Coolant Temperature	> -40.00 [DegC]		
					Ambient Temperature	> -40.00 [DegC]		
					The distance covered since last regeneration	> -1.00 [km]		
					Correction of CCB model	< 400.00 [%]		
					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.
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 fuel cut-off condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 4.50 [%] < -1.40 [%]	Engine running		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
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_NOx1_O2_RawNotRlb == FALSE		
					No SQA learning is active	FAD_SQA_LrnET_Enbl == FALSE		
					Enabled in combustion mode	refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**)		
					No Exhaust Brake active i.e. intake manifold pressure	< 1,000.00 [kPa]		
					No pending or confirmed DTCs	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		

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	< 10.00 [%]		
					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 Engine is running No electrical failure on NOx2 sensor Combustion mode dependent enabling flag	> -1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 10.8V TRUE NOX_NOx2_StBitChkFlt ==FALSE TRUE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_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 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 Engine is running No electrical failure on NOx2 sensor Combustion mode dependent enabling flag	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 10.8V TRUE NOX_NOx2_StBitChkFlt ==FALSE TRUE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMaxCmbMode**	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	
					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	> 10.8V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit Low Voltage	P22A4	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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	TRUE > 11.00 V TRUE FALSE > 10.8V	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 rraw resistance is in range	This diagnosis verifies if the Downstream NOx sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	< 0.03 % >- 0.03 %	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_B NOx Sensor Bus relay is commanded ON Delay timer once sensor supplyisin range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active	> 11.00 V FALSE TRUE > 45 sec > 180 sec > 5 sec 30 sec	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense Low Voltage	P22A8	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Sense pin (HTemp)	groundshort on HTemp	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense High Voltage	P22A9	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE < 0.03 % >- 0.03 %	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	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	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	> 11.00 [V] OXY_NOx2_O2_RawNotRlb == FALSE < 1,000.00 [kPa] < 1,000.00 [kPa] NOX_Snsr2_NotVld NOX_Snsr2_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.
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 and Relative_timer are processed with First Order Lag Filter Logic:	Engine is running	TRUE	More test per trip are allowed with First Order Lag Filter Logic. Total_Timer NOx sensor dynamic observation maximum time is 30 sec. Once reached the diagnostic provides a result.	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					Combustion mode dependent enabling flag	**NOX_NOx1_IncrDynCmbMode**		
					NOx Sensor Bus relay is commanded ON	TRUE		
			Delay_Timer_NOx_Raw Delay time starts once NOx model concentration reaches 50 ppm and completes once NOx1 sensor raw reaches 50 ppm.	> 1 sec OR	No failure on NOx1 CAN communication - No electrical failure on NOx1 sensor - No failure on NOx1 plausibility	NOX_Snsr1_FA ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngLoFlt ==FALSE		
			Relative_timer= (Timer_NOx_Raw-Timer_NOx_Model) / Timer_NOx_Model	> 1 %	No out of range high failure on NOx1 sensor	NOX_NOx1_OutOfRngHiFlt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
			Timer_NOx_Raw Time starts once NOx1 raw signal reaches 50 ppm and completes once the raw signal reaches 150 ppm.		Sensor dewpoint is reached	TRUE		
					Injection small quantity adjustment (SQA) learning is not active	FAD_SQA_LrnET_Enbl ==FALSE		
			Timer_NOx_Model Time starts once NOx model concentration reaches 50 ppm and completes once the raw signal reaches 150 ppm.		No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Short and Long timer are processed with First Order Lag Filter Logic:	No failure on mass air flow sensor No failure on EGR valve actuator No failure on any input used by the Upstream NOx model No failure on NOX1 decreasing dynamic check Intake manifold absolute pressure Upstream NOx sensor raw concentration Engine working point stability conditions: a) Modeled Upstream NOx concentration b) Engine speed c) Injection fuel quantity requested d) condition a) b) c) are fulfilled for time Once all condition above are fulfilled diagnostic run whenever all the following condition are verified (fuel stepdetection logicwithin a time window): e) Injected fuel quantity	MAF_MAF_SnsrFA ==FALSE EGR_PstnShtOffReqFA ==FALSE EXM_NOxMdl_ExhMnfdNotVld ==FALSE NOX_NOx1_DecrDynChkFlt ==FALSE < 950 kPa < 20 ppm < 15 ppm > 600 rpm < 3,500 rpm > 5 mm^3 > 1 sec > 30 mm^3		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					request f) condition e) is fulfilled for time	 <(2 sec+ 3 sec)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Slow Response High to Low Bank 1 Sensor 1	P22FA	This diagnosis verifies the dynamic behaviour of Upstream NOx sensor during decreasing NOx concentration transient	Check if there is a slow dynamic behaviour of Upstream NOx sensor raw signal read during decreasing NOx concentration maneuver (load to overrun)	Short and Long timer are processed with First Order Lag Filter Logic:	Engine is running	TRUE	More test per trip are allowed with First Order Lag Filter Logic	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					Combustion mode dependent enabling flag	**NOX_NOx1_DecrDynCmbMode**		
					NOx Sensor Bus relay is commanded ON	TRUE		
			Short Timer: time between % to % of NOx raw signal reduction	> 7 sec OR	No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A		
					No electrical failure on NOx1 sensor	NOX_Snsr1_ElecFA ==FALSE		
			Long Timer: time between % to % of NOx raw signal reduction	> 7 sec	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		
					Sensor dewpoint is reached	TRUE		
					Injection small quantity adjustment (SQA) learning is not active	FAD_SQA_LrnET_Enbl ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on intake	MAP_SensorFA==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					manifold absolute pressure sensor			
					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 Upstream NOx model	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					Intake manifold absolute pressure	< 950 kPa		
					Modeled Upstream NOx concentration	> 100 ppm		
					Engine speed	> 1,000 rpm < 3,500 rpm		
					Injection fuel quantity requested	> 15 mm^3 < 80 mm^3		
					exhaust mass flow	> 20 g/s		
					Injection fuel quantity requested steady state: a) injection fuel variation within a stability window	> 0.80 % < 1.20 %		
					b) condition a) is fulfilled for time	> 1 sec		
					Once all condition above are fulfilled diagnostic run whenever all the following condition are verified			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(overrun detection logic): a) overrun timer b) EGR measured position	 < 2 sec < 60 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	P22FE	This diagnosis verifies the Downstream NOx sensor sensing cells integrity during afterrun	Check if there is any clogging in the Downstream NOx sensor measurement cavities that could result in reduced NOx-sensitivity. The sensor internal operating current set-points are changed such way, that the O2 concentration in 2nd sensor cavity is around 1000ppm. One test result is measured in fresh sensor state (at supplier plant) and stored in the sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	> 150 % OR < 50 %	No electrical failure on NOx2 sensor No out of range low failure on NOx2 sensor No out of range high failure on NOx2 sensor No failure on NOx2 CAN communication No electrical failure on NOx1 sensor No failure on O2 from NOx1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on crank sensor No failure on exhaust temperature sensor (downstream SCR) No failure on HC injector No failure on Vehicle Speed sensor	NOX_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLoFlt ==FALSE NOX_NOx2_OutOfRngHiFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE NOX_Snsr1_ElecFA ==FALSE OXY_NOx1_O2_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE CrankSensor_FA ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 10 test per trip are allowed If Fast Initial Response EWMA is active then 10 test 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.
					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		
					Powertrain relay voltage	> 11.00 V		
					NOx2 sensor supply in range	> 10.8V		
					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		
					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 < 400 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 range	< 800 rpm		
					r) fuel request in idle range	< 20 mm^3		
					s) conditions q) r) is fulfillled for time	< 1,800 sec		
					t) timer of condition s) is reset if one of the following condition is fulfilled (idle off			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					recognition - t) conditions):			
					t.1) exhaust temperature (downstream SCR)	> -7 °C		
					t.2) condition t.1) is fulfilled for time (once idle has been detected)	> 5 sec		
					t.3) vehicle speed	> 5 mph		
					t.4) condition t.3) is fulfilled for time (once idle has been detected)	> 5 sec		
					t.5) exhaust mass flow	> 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)			
					u.1) exhaust temperature (downstream SCR)	> -7 g/s		
					u.2) condition u.1) is fulfilled for time (once condition u) has been detected)	> 5 sec		
					u.3) vehicle speed	> 5 mph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					u.4) condition u.3) is fulfilled for time (once condition u) has been detected) u.5) exhaust mass flow u.6) condition u.5) is fulfilled for time (once condition u) has been detected) Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off	> 10 sec > 20 g/s > 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 3	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 Circuit High Bank 1 Sensor 3	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 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 Circuit Intermittent/ Erratic Bank 1 Sensor 3	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	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	30.00 failures over 40.00 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	> 60.00 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.
Catalyst Temperature Too Low During Regeneratio n	P244C	This diagnosis detects an Injector or a catalyst that is malfunctioning or losses in the exhaust gas system	The DTC is set when: Counter of subsequent Interrupted regeneration The interrupted regeneration counter increases only when the interruption has caused by: - Regeneration process interrupted due to maximum regeneration time elapsed. Maximum time allowed to complete DPF regeneration expired (according to regeneration mission profile) OR - Post injection pulses not enabled in time.Time to release POST injection is expired (according to regeneration mission profile) OR - Regeneration Steady phase not entered in time Time to reach DPF regeneration steady state condition is expired (according to regeneration mission profile) The counter is reset when	> 0.00 > **Maximum allowed time to complete regeneration** > **Maximum allowed time to release post injections for regeneration** > **Maximum allowed time to reach steady state for regeneration**	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	No debounce function task: 100 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Pressure Sensor A Circuit	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 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] **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.
Diesel Particulate Filter Pressure Sensor A Circuit Range/ Performance	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	1 [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	EGT_SnsrDPF_UpFA and with		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on DPF Upstream temperature 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	<= 0.08 [%]	Test enabled by calibration and with	1	15 fail samples out of 20 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine running and with No fault on exhaust gas pressure sensor (electrical, plausibility, offset and quick change in and logic) and with Engine speed variation greater and with Fuel quantity variation greater	== TRUE EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent > 20.00 [rpm/s] > 1.00 [l/s]	Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Pressure Sensor A Circuit Low	P2454	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal s high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 3.00 [%]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	160 fail samples out of 250 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.
Diesel Particulate Filter Pressure Sensor A Circuit High	P2455	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	160 fail samples out of 250 samples Function task: 12.5 ms	Type B, 2 Trips
			Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	160 fail samples out of 250 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.
Diesel Particulate Filter Pressure Sensor A Circuit Intermittent/ Erratic	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 80 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) (Duramax applications)	P2457	This monitor checks the HP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	HP EGR Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. HP EGR Cooler efficiency is computed as the ratio between (HP EGR cooler upstream temperature - HP EGR cooler downstream temperature) and (HP EGR cooler upstream temperature - Engine coolant temperature).	< 60.00 [%]	Calibration on diagnostic enabling	1.00 ==TRUE	Test executed after 200.00 samples are collected and their average is computed	Type B, 2 Trips
					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	>= -7.00 [°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			
					HP EGR flow in range	< 80.00 [mg/s] > 2.50 [mg/s]		
					for a time	>= 3.00 [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		
					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		

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 Bypass	CEB_ActrCktLoFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Regeneration Frequency (Nominal Engine Out Soot Model and Configurable Correction Block used	P2459	This diagnosis detects a too high DPF regeneration frequence due to a dirty combustion or a leak in the exhaust or in the intake line or a not efficient DPF.	Ratio between Soot Model based on Delta Pressure measure + Configurable Correction Block and Engine Out Soot Model AND (few kilometers spent after the previous regeneration AND few time spent after the previous regeneration AND few fuel consumed after the previous regeneration	>= 10.00	Test enabled by calibration (TRUE--> enable FALSE --> disable) Nominal Engine Out Soot Model is used, i.e. Configurable Correction Block is used, i.e. At least one successful regeneration occurs Δp model is always valid before start of regeneration for a time The Nominal Engine out soot model shall be valid for a time Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time Ignition voltage in range Successful Regeneration shall be made in the previous regeneration Regeneration starts No Transient driving cycle is present, i.e. the delta fuel request during the soot loading time is	1.00 1.00 = 1 (true) 0.00 = 1 (true) >= 0.00 s > 0.00 % of the soot loading time > 1.00 % of the soot loading time 13.00 mm3/s	No debounce function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DPF regeneration is not requested at service. (Soot percentage evaluated by ∆p model plus Configurable Correction Block (CCB) OR Many kilometers spent after the previous regeneration OR lots of time spent after the previous regeneration OR many fuel consumed after the previous regeneration)	 > 0.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit (ECB 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 System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from fully closed (default position)	== 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.
Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P245B	This monitor checks if the HP EGR Cooler Bypass got mechanically stuck in any positions	absolute value of position tracking error (setpoint position - measured position) > positive threshold	> 16.00 [%]	Test enabled by calibration	== 1.00	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Position control in closed loop (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, position deviation)	CEB_ActrFlt== FALSE CEB_PstnSnsrFlt== FALSE CEB_ObstructionTFTKO == FALSE		
					Position setpoint is in steady state conditions for a certain time	< 160.00 [%/s] > -160.00 [%/s] for 0.40 [s]		
					Engine coolant temperature > threshold	> 70.00 [°C]		
					No faults present on engine coolant temperaturesensor	ECT_Sensor_FA== FALSE		
					Outside airtemperature > threshold	> -23.00 [°C]		
					No faults present on outside airtemperature	OAT_PtEstFiltFA ==FALSE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit High (ECB DC Motor)	P245D	This monitor checks if the HP EGR cooler bypass valve commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 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.
Diesel Particulate Filter Soot Accumulation	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	Filtered flow resistance (DPF_ResistFlowFltd)	> **Flow Resistance High 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_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		
					Flow Resistance calculation enable	DPF_ResistFlowCalcOff == False		
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 70.00 [l/s] for > 2.00 [s]		
					Soot trapped in the DPF	> -1.00 [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 < 700.00 [DegC] for > 25.00 [s]		
					Engine Coolant Temperature	> -40.00 [DegC]		
					Ambient Temperature	> -40.00 [DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 Circuit High Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 B, 2 Trips
			Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 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 Circuit Intermittent/ Erratic Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 EGT1sensorin 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 Circuit Low Bank 1 Sensor 5 DOC1+SCR +DOC2 +DPF	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 Circuit High Bank 1 Sensor 5 DOC1+SCR +DOC2 +DPF	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 B, 2 Trips
			Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 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 Circuit Intermittent/ Erratic Bank 1 Sensor 5 DOC1+SCR +DOC2 +DPF	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.
DEF tank heater supply undervoltage monitoring	P248A	This diagnosis verifues that the tank heater supply voltage is under the threshold of correct functioning	Tank heater supply under-voltage (System Battery voltage - Tank heater Supply Voltage value)	 > 3.00	Test enabled by calibration Powertrain relay in range Run Crank Active Cranking phase excluded No SCR Power Module CAN loss of communication Heating strategy is requesting the Heater to be activated	1.00 U010E, Lost Communication With Reductant Control Module (SCR) VeSCRR_b_HeatA_On == TRUE	10.00 failures out of 12.00 samples Time basis = 500ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF line heater supply undervoltage monitoring	P248C	This diagnosis verifues that the line heater supply voltage is under the threshold of correct functioning	Line heater supply under-voltage (System Battery voltage - Line heater Supply Voltage value)	> 3.00	Test enabled by calibration Powertrain relay in range Run Crank Active Cranking phase excluded No SCR Power Module CAN loss of communication Heating strategy is requesting the Heater to be activated	1.00 U010E, Lost Communication With Reductant Control Module (SCR)	10.00 failures out of 12.00 samples Time basis = 500ms	

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	= 1.00	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop DPF Regeneration Control At Limit - Temperature Too Low DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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):**		Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples Function task: 100 ms	Type B, 2 Trips
						DPF_DPF_St == Warm_Up		
			Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 100.00 degC	Regeneration state in warm up DPF Mode	EGT_HC_CL_Enbl [Boolean]		
					HCI temperature closed loop control shall be enabled	> 11.00 [V]		
						EXM_TurbFlowNotValid [Boolean]		
					Battery voltage	VehicleSpeedSensor_FA [Boolean]		
					No fault on exhaust mass flow	EGT_SnsrDPF_UpFlt [Boolean]		
					No fault on vehicle speed			
					No Fault on DPF upstream temperature sensor	**EnginePointEnable_HC_TempDeviation** [Boolean]		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	> 0.00 [kph]		
						< 250.00 [g/s]		
					Vehicle speed	> 8.00 [g/s]		
						< 100.00 [g/s]		
					Exhaust mass flow AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow Filtered Exhaust mass flow variation (absolute value) The system shall not be in cut off for a calibratable timer. All the above enabling conditions met for at least a calibratable timer	< 30.00 [sec] > 30.00 [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 Regeneration state in Steady state DPF Mode HCI temperature closed loop control shall be enabled Battery voltage	1.00 [Boolean] DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean]	1,500.00 fail samples out of 1,850.00 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 exhaust mass flow No fault on vehicle speed 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 Vehicle speed Exhaust mass flow AND Exhaust mass flow Filtered Exhaust mass flow variation (absolute value) The system shall not be in cut off for a calibratable timer. All the above enabling conditions met for at least a calibratable timer	VehicleSpeedSensor_FA [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] > 0.00 [kph] < 250.00 [g/s] > 8.00 [g/s] < 100.00 [g/s] < 30.00 [sec] > 30.00 [sec]		

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 High DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	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 vehicle speed 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 Vehicle speed Exhaust mass flow AND	1.00 [Boolean] DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] > 0.00 [kph] < 250.00 [g/s] > 8.00 [g/s] < 100.00 [g/s] < 30.00 [sec]	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)			
					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.
Diesel Particulate Filter Restriction - Ash Accumulation	P24A4	This diagnostic detects a clogged DPF that cannot be replace anymore	Filtered flow resistance (DPF_ResistFlowFltd)	> **Flow Resistance Too High Threshold**	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	20.00 failures over 40.00 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 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		
					Flow Resistance calculation enable	DPF_ResistFlowCalcOff == False		
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 70.00 [l/s] for > 2.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Soot trapped in the DPF	> -1.00 [Pct]		
					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]		
					Engine Coolant Temperature	> -40.00 [DegC]		
					Ambient Temperature	> -40.00 [DegC]		

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 check if the EGR Cooler Bypass is mechanically stuck in bypass mode	position after P245B has set > threshold	> 15.00 [%]	Test enabled by calibration	== 1.00	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Position control in closed loop (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, position deviation)	CEB_ActrFlt== FALSE CEB_PstnSnsrFlt== FALSE CEB_ObstructionTFTKO == FALSE		
					Position setpoint is in steady state conditions for a certain time	< 160.00 [%/s] > -160.00 [%/s] for 0.40 [s]		
					Engine coolant temperature > threshold	> 70.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA== FALSE		
					Outside airtemperature > threshold	> -23.00 [°C]		
					No faults present on	OAT_PtEstFiltFA		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Sensor Electrode raw current 1 AND Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	< 2.00 A < 0.09 A	Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Fault not active on undervoltage for Soot Sensor Control Unit supply No Electrical faults present on Soot Sensor Soot Sensor is in regeneration phase Soot Sensor temperature Soot Sensor Electrode current measurement enabled	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_EleclFault) 580.00 < 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	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 20.00 failures out of 40.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Heater Control Circuit/Open	P24B3	This diagnosis detects an open circuit on the soot sensor heater line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Heater current	I < 0.5 A OR I > 15 A	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle No Heater failures detected in the Sensor Control Unit ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 0 % > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 15.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Heater Control Circuit Low	P24B5	This diagnosis detects a short to ground on the soot sensor heater line	Diagnosis executed in Sensor Control Unit: Soot Sensor Heater current	I < 0.5 A OR I > 15 A	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle No Soot Sensor Heater failures detected in the Sensor Control Unit ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 0 % > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 10.00 failures out of 15.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Heater Control Circuit High	P24B6	This diagnosis detects a short to power on the soot sensor heater line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Heater current OR Soot Sensor Heater switch output (off state) OR Soot Sensor Heater switch input (off state)	 > 0.2 A = 1 (for one of the last 5 measurements) = 1 (for one of the last 5 measurements)	Soot Sensor Control Unit conditions: Soot Sensor Heater Off ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 5.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 < 72.00 [%5V] OR > 85.00 [%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_EleclFault) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd	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	> 75.00 kPa		
					Ambient air temperature	> -12.00 °C		
					Exhaust gas volumetric flow at soot sensor	> 35.00 mg/s		
					Time after sensor regeneration	> 225.00 s		
					Soot Sensor Dew Point has been reached			
					)			

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: 10.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Stuck Closed (VGT Smart)	P2599	This monitor checks if the VGT vanes got mechanically stuck in closed position	position after P0046 has set > threshold	> 25.00 [%]	Test enabled by calibration	== 1.00	No debounce is present: DTC sets as soon as the error is present Function task: 25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Position control in closed loop (no faults present on VGT position sensor, VGT vanes, position deviation)	CFM_VGT_CommFA == FALSE VGT_SmartActrFA == FALSE VGT_PstnSnsrOfstFA == FALSE		
					Position setpoint is in steady state conditions for a certain time	< 100.00 [%/s] > -100.00 [%/s] for 0.50 [s]		
					Engine coolant temperature > threshold	> -60.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA == FALSE		
					Outside air temperature > threshold	> -60.00 [°C]		
					No faults present on outside air temperature	OAT_PtEstFiltFA ==FALSE		

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

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	P2627	This DTC detects if O2 signal is lower than physical minimum value or a Trim Resistance pin open load.	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	P2628	This DTC detects if O2 signal is higher than physical maximum value or a Trim Resistance pin open load.	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.
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		N/A	Type A, 1 Trips
					Diagnosis enabled via calibration	1.00 [Boolean]		
					Manufacturer Enable Counter (MEC) == 0			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injector Data Incompatible	P2691	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 6 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 6 EIA code not written via DID (DID $65).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injector Data Incompatible	P2692	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 7 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 7 EIA code not written via DID (DID $66).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injector Data Incompatible	P2693	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 8 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 8 EIA code not written via DID (DID $67).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Range/ Performance Bank 1 Sensor 1	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	> 4.50 [%] < -1.25 [%]	Engine running		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
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_NOx1_O2_RawNotRlb == FALSE		
					Enabled in combustion mode	refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**)		
					(No After injection release AND Boolean Flag used to enable After injection status is TRUE)	0 [boolean]		
					No pending or confirmed DTCs	NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowNotValid		
					Stable fuel cut-off condition has been reached i.e. following			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					conditions are met for a calibrateable time:	> 1.00 [s]		
					a. Engine speed in operating range	> 800 [rpm] < 2,500 [rpm]		
					b. EGR mass flow	< 1,000.00 [mg]		
					c. Injected fuel quantity in operating range	> 5.00 [mm^3] < 80.00 [mm^3]		
					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.
O2S Circuit Range/ Performance Bank 1 Sensor 2	P2A01	This DTC aims to detect a drift of Sensor 2 O2 measured value (A) from Sensor 1 O2 measured value (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 5.80 [%] < -3.80 [%]	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	== 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.
Reductant Delivery Performance - Hydrualic Monitoring	P2BAA	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery.	**Non-EWMA** Measured DEF pressure drop after the injection has been performed is lower than the expected pressure drop. The expected pressure drop depends on the motorpump efficiency (that is estimated based on the average commanded duty cycle). Measured DEF pressure drop **EWMA**	 < **P2BAA RDP Min Press Drop** table	Test enabled by calibration (TRUE->Enable False -> Disable) Diag System Disable Ambient Air Temperature (degC) Barometric Pressure (kPa) DEF Injector Component Management Ready DEF Injector Cooling Request DPF Regeneration Active DEF Injector Temperature (degC) DEF Injector Temperature (degC) Gradient temperature of DEF Injector (degC) within a time period of (ms) Integrated DEF Injected Mass (mg) Integrated DEF Injected Mass (mg) Integrated Upstream NOx Flow (mg)	1.00 == FALSE > -20.00 > 70.00 == TRUE == FALSE == FALSE > 200.00 < 500.00 < 3.00 = 100ms * 100.00 > 3,000.00 < 10,000,000,000.00 >= 2,000.00	Function Task: 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Upstream SCR Exhaust Flow (g/s)	> 5.00		
					DEF System Hydraulic System Shutoff	== FALSE		
					No DEF Mass Flow less than calibratable mass (mg/s) for calibratable time (ms).	< 1,200.00 >= 100ms * 0.00		
					DEF Tank Status	== NOT FROZEN		
					Upstream DEF Injector Temperature Signal Fault	== FALSE		
					Outside Air Temperature Signal Fault	[OAT_PtEstFiltFA or OAT_OAT_SnsrNonEmissFA] == FALSE		
					Upstream SCR Exhaust Flow Signal Fault	EXF_TotExhSCR_UpFlt == FALSE		
					Barometric Pressure Signal Fault	AAP_AmbientAirPresDfltd == FALSE		
					Upstream NOx Sensor Concentration Signal Fault	== FALSE		
					Vehicle Speed Signal Fault	VehicleSpeedSensor_FA == FALSE		
					Vehicle Speed below calibratable threshold (kph) for calibratable time (ms).	<= 0.00 >= 100ms * 30.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DEF Metering Valve Tip Stuck Fault Engine Mode	SCR_TipStuckFltSt == FALSE == RUNNING		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Control Circuit (Single and Two stage VGT DC Motor)	P0045	This monitor checks if the DC-Motor VGT commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Control Circuit High (Single and Two stage VGT DC Motor)	P0048	This monitor checks if the DC-Motor VGT commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response - Lean to Rich Bank 1 Sensor 1	P014D	This DTC checks if oxygen value dynamic is slower compared to a functioning sensor. Test is performed in transitions from overrun to high load. Once generic enabling conditions are met, diagnosis waits for an overrun stable condition. After that a fuel increase is detected within a calibrated time. Different timers are updated: - Timer_1 is incremented when O2Model < 19.00 [%] AND O2 > 19.00 [%] - Timer_2 is incremented when O2Model < 19.00 [%] AND O2 < 19.00 [%] - Timer_3 is incremented when O2Model < 19.00 [%] AND O2Model > 15.00 [%] - Timer_4 is incremented when O2Model < 19.00 [%] AND O2Model > 12.00 [%] - Timer_5 is incremented when O2Model < 19.00 [%] O2Model is based on	One of the following conditions shall be true: EWMA filtered Timer_1 EWMA filtered Timer_error	 > 0.92 [s] > 2.00 [-]	**Global Enabling Condition** Engine running System voltage in range Sensor is fully operative No SQA learning is active AND Boolean Flag used to enable SQA learning check is TRUE No After Injection release Enabled in combustion mode No pending or confirmed DTCs	 > 11.00 [V] OXY_O2_NOx1_SDC_CrtdNotRlb == FALSE FAD_SQA_LrnET_Enbl == FALSE 1 [boolean] **KaOXYD_b_NOx1_DecrDynChkCmbEnbl** NOX_Snsr1_NotVld OXY_NOx1SignRngMinFlt OXY_NOx1SignRngMaxFlt OXY_NOx1ChkOvrrnFlt OXY_NOx1ChkLoadFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_PstnShtOffReqFA	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 A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		injected fuel quantity and air mass. Test ends when one of the following condition is verified: - O2 < 15.00 [%] - Timer_5 > 10.00 [s] - Timer_4 > 0.79 [s] After test end, all the following condition shall be verified to evaluate test validity: - Timer_4 < 0.79 [s] - O2Model < 12.00 [%] - Timer_3 < 0.16 [s] If test is valid: Timer_error = (Timer_2 - Timer_3) / Timer_3 is calculated and EWMA is applied on Timer_1 and on Time_error.			**Additional enabling conditions for transitioning state machine from stable operation state to wait fuel injection state:** Operating point reached and stable i.e. following conditions are met for a time a. Engine speed in operating range b. Injected fuel quantity **Additional enabling conditions for transitioning state machine from wait fuel injection state to timer evaluation state:** Injected fuel quantity **Additional enabling conditions when in timer evaluation state:** Injected fuel quantity within a time	OXY_O2_NOx1PlausMdlFlt > 1.00 [s] > 1,250 [rpm] < 3,000 [rpm] < 1 [mm^3] > 1 [mm^3] > 20 [mm^3] < 1.00 [s]		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Glow Plug Circuit Low	P066A	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Glow Plug Circuit High	P066B	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2 = 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Glow Plug Circuit Low	P066C	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Glow Plug Circuit High	P066D	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Glow Plug Circuit Low	P066E	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Glow Plug Circuit High	P066F	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Glow Plug Circuit/Open	P0671	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Glow Plug Circuit/Open	P0672	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Glow Plug Circuit/Open	P0673	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Glow Plug Circuit/Open	P0674	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Glow Plug Circuit Low	P067A	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Glow Plug Circuit High	P067B	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Supply Circuit (Single and Two stage VGT DC Motor)	P169E	This monitor checks if the VGT DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Control Circuit Shorted (Single and Two stage VGT DC Motor)	P169F	This monitor checks if the VGT commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit B Low (SENT position sensor)	P16B0	This monitor checks if the VGT SENT position sensor protocol is out of range low	HWIO counter of valid VGT SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO VGT SENT position protocol status	> 2.50 [s] AND == LOW	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.
Sensor/ Switch Communication Circuit B High (SENT position sensor)	P16B1	This monitor checks if the VGT SENT position sensor protocol is out of range high	HWIO time counter since last valid VGT SENT position was transmitted > threshold (age error = TRUE) AND HWIO VGT SENT position protocol status	> 2.50 [s] AND == HIGH	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.
Sensor/ Switch Communication on Circuit B Performance (SENT position sensor)	P16B2	This monitor checks if the VGT SENT position sensor protocol has performance problems	HWIO message fault on VGTSENT position == TRUE OR (number of VGT SENT position counters has been updated AND HWIO time counter since last valid VGTSENT position was transmitted > threshold (age error = TRUE))	message error == TRUE OR (----------- AND > 2.50 [s])	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range	== 1.00 > 11.00 [V] VGT_SENT_OOR_Flt == FALSE	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.
Turbocharger VGT A Current Range/ Performance (Single and Two stage VGT DC Motor)	P16FA	This monitor checks if an excessive current flows through the VGT DC-Motor (e.g. shunt circuit between load, VGTDC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit (ECB Vacuum)	P245A	This monitor checks if the HP EGR cooler bypass valve command is in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in COOLING mode Shared High Side driver driven closed	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Low (ECB Vacuum)	P245C	This monitor checks if the HP EGR cooler bypass valve command is shorted to ground	Resistance to ground lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in COOLING mode Shared High Side driver driven closed	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit High (ECB Vacuum)	P245D	This monitor checks if the HP EGR cooler bypass valve command is shorted to power supply	Resistance to supply lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in BYPASS mode Shared High Side driver driven closed	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position Sensor Circuit Low (SENT position sensor)	P2564	This monitor checks if the VGT SENT position sensor is out of electrical range low	SENTposition raw voltage < low threshold	< 3.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range and SENT performance	== 1.00 > 11.00 [V] VGT_SENT_OOR_Flt ==FALSE VGT_SENT_PerfFlt ==FALSE	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.
Turbocharger VGT A Position Sensor Circuit High (SENT position sensor)	P2565	This monitor checks if the VGT SENT position sensor is out of electrical range high	SENTposition raw voltage > high threshold	> 97.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range and SENT performance	== 1.00 > 11.00 [V] VGT_SENT_OOR_Flt ==FALSE VGT_SENT_PerfFlt ==FALSE	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.
Turbocharger VGT A Stuck Open (Single and Two stage VGT DC Motor)	P2598	This monitor checks if the VGT vanes got mechanically stuck in a position more open than what is required by the control	position tracking error (setpoint position - measured position) > positive threshold	> **P2598: Positive Position Tracking Error Threshold** [%]	Test enabled by calibration	== 1.00	640.00 fail counts out of 800.00 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]		
					Position control in closed loop (no faults present on VGT position sensor, VGT vanes, position deviation)	VGT_PstnSnsrFA== FALSE VGT_ActCktFA == FALSE VGT_PstnCntrlFA == FALSE		
					Position setpoint is in steady state conditions	< 40.00 [%/s] > -40.00 [%/s]		
					Engine speed > threshold	> 1,500.00 [rpm]		
					Engine coolant temperature > threshold	> -7.00 [°C]		
					Intake manifold temperature > threshold	> -7.00 [°C]		
					All previous conditions must be verified for a minimum calibratable time	> 0.50 [s]		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit Low	P0407	This monitor checks if the HP EGR cooler inlet coolant temperature sensor is out of electrical range low. The sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	HP EGR cooler inlet coolant temperature resistance value	< 55.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00 ==TRUE ==TRUE > 11.00 [V]	5.00 fail counts out of 6.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit High	P0408	This monitor checks if the HP EGR cooler inlet coolant temperature sensor is out of electrical range high. The sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	HP EGR cooler inlet coolant temperature resistance value	> 134,000.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00 ==TRUE ==TRUE > 11.00 [V]	5.00 fail counts out of 6.00 sample counts Function task: 100 ms	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Sensor "B" Circuit Intermittent/ Erratic	P046F	This monitor checks if the HP EGR cooler inlet coolant temperature sensor has an intermittent fault.	HP EGR cooler inlet coolant temperature value	> T_MAX_threshold [°C] OR < T_MIN_threshold [°C] where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails * ts * f) - #fails = number of consecutive samples where the test failed (temperature outside the range) - ts = sensor sampling time - f = inverse of the sensor filter response time (1,000.00 [Hz]) - T_MAX = sensor maximum actual reading (500.00 [°C]) - T_MIN = sensor minimum actual	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on HP EGR cooler inlet coolant temperature sensor	1.00 ==TRUE ==TRUE > 11.00 [V] CEW_TempInCktFA ==FALSE	3.00 fail counts out of 4.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				reading (-200.00 [°C]) - T_last_good = last good temperature (inside the range) measured by the sensor				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too High DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P144F	DPF Control Temperature Deviation diagnostic monitorsthe exhaust gas temperature Downstream the 1st ccDOC (EGT2) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring runs only in DPF steady state logic	**Hi Temperature monitoring (Negative Deviation):** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	< -100.00 degC	Test shall be enabled by calibratable flag Regeneration state in Steday state DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on ccDOC Downstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	1.00 [Boolean] DPF_DPF_St== Steady state EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF _TempDeviation** [Boolean] > 0.00 [kph] < 100.00 [g/s]	650.00 fail samples out of 800.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Vehicle speed	> 10.00 [g/s]		
					Exhaust mass flow	< 100.00 [g/s]		
						< 5.00 [sec]		
					AND Exhaust mass flow	> 2.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)			
					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.
Intake Manifold Runner Control Stuck Closed (Swirl with Position Feedback)	P2006	This monitor checks if the Swirl actuator got stuck in closed position	position after P20F8 has set > threshold	> 100.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Engine coolant temperature >= threshold Time elapsed since the smart actuator switched on greater than a threshold No faults present on engine coolant temperature sensor Outside air temperature >= threshold No faults present on outside air temperature sensor Absolute value of position setpoint is in steady state conditions for a certain time	== 1.00 > 11.00 [V] >= 60.00 [°C] >= 30.00 [s] ECT_Sensor_FA ==FALSE >= -7.00 [°C] OAT_PtEstFiltFA ==FALSE < 50.00 [%/s] for 0.50 [s] SWC_DrvrCktFA	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.
					No faults present on Swirl driver actuator No faults present on Swirl position feedback No faults present on Swirl position deviation No faults present on Swirl Integrity or slow response	==FALSE SWC_PstnFdbckElecFA ==FALSE SWC_ObstructionFlt ==FALSE SWC_IntegSlowRespFA ==FALSE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Performance (Swirl with Position Feedback)	P200A	This monitor checks if the Swirl mechanical stop learnings are inside the plausible range and if the valve is not excessively slow	raw position when the flaps are in fully closed position < low threshold OR raw position when the flaps are in fully closed position > high threshold OR raw position when the flaps are in fully open position < low threshold OR raw position when the flaps are in fully open position > highthreshold	< 81.00 [%] OR > 92.00 [%] OR < 25.00 [%5V] OR > 40.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Engine coolant temperature greater than threshold No faults present on engine coolant temperature sensor No faults present on Swirl driver actuator No faults present on Swirl position feedback End Of Trip event has elapsed	== 1.00 > 11.00 [V] >= 60.00 [°C] ECT_Sensor_FA ==FALSE SWC_DrvrCktFA ==FALSE SWC_PstnFdbckElecFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			response time in closing direction > high threshold OR response time in opening direction > high threshold OR total time needed to complete either closing or opening phase of the slow response test >= high threshold	> 5.00 [s] OR > 5.00 [s] OR >= 10.00 [s]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Engine coolant temperature greater than threshold Time elapsed since the smart actuator switched on greater than a threshold No faults present on engine coolant temperature sensor No faults present on Swirl driver actuator No faults present on Swirl position feedback End Of Trip event has elapsed	== 1.00 > 11.00 [V] >= 60.00 [°C] >= 30.00 [s] ECT_Sensor_FA ==FALSE SWC_DrvrCktFA ==FALSE SWC_PstnFdbckElecFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Position Sensor Range/ Performance (Swirl with Position Feedback)	P2015	This monitor checks if the Swirl position feedback has a frequency too high or too low	(Swirl position pulse period < low threshold OR Swirl position pulse period > high threshold) AND Swirl duty cycle AND Swirl duty cycle	 < 0.00 [ms] > 64.00 [ms] != 0% != 100%	Test enabled by calibration System out of the cranking phase Time elapsed since the smart actuator switched on greater than a threshold PT relay supply voltage in range	== 1.00 >= 30.00 [s] > 11.00 [V]	52.00 fail counts out of 62.00 sample counts Function task: 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Position Sensor Circuit Low (Swirl with Position Feedback)	P2016	This monitor checks if the Swirl position feedback is out of electrical range low	Swirl position pulse period == maximum constant pulse period AND Swirl duty cycle	== 30.00 [ms] == 0%	Test enabled by calibration System out of the cranking phase Time elapsed since the smart actuator switched on greater than a threshold PT relay supply voltage in range	== 1.00 >= 30.00 [s] > 11.00 [V]	50.00 fail counts out of 62.00 sample counts Function task: 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Position Sensor Circuit High (Swirl with Position Feedback)	P2017	This monitor checks if the Swirl position feedback is out of electrical range high	Swirl position pulse period == maximum constant pulse period AND Swirl duty cycle	== 30.00 [ms] == 100%	Test enabled by calibration System out of the cranking phase Time elapsed since the smart actuator switched on greater than a threshold PT relay supply voltage in range	== 1.00 >= 30.00 [s] > 11.00 [V]	50.00 fail counts out of 62.00 sample counts Function task: 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Manifold Runner Control Circuit Performance (Swirl with Position Feedback)	P20F8	This monitor checks if the Swirl flaps got mechanically stuck in any positions	Absolute value of position tracking error (setpoint position - measured position) > positive threshold	> 10.00 [%]	Test enabled by calibration	== 1.00	80.00 fail counts out of 100.00 sample counts Function task: 25 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Engine coolant temperature >= threshold	>= 60.00 [°C]		
					Time elapsed since the smart actuator switched on greater than a threshold	>= 30.00 [s]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside airtemperature >= threshold	>= -7.00 [°C]		
					No faults present on outside airtemperature sensor	OAT_PtEstFiltFA ==FALSE		
					Absolute value of position setpoint is in steady state conditions for a certain time	< 50.00 [%/s] for 0.50 [s]		
					No faults present on Swirl	SWC_DrvrCktFA ==FALSE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooling System Performance (OBDII market only) (MDE applications)	P2457	This monitor checks the HP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	HP EGR Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. HP EGR Cooler efficiency is computed as the ratio between (HP EGR cooler upstream temperature - HP EGR cooler downstream temperature) and (HP EGR cooler upstream temperature - Engine coolant temperature). The Engine coolant temperature used is coming from the HP EGR cooler inlet coolant temperature sensor.	< 50.00 [%]	Calibration on diagnostic enabling	1.00 ==TRUE	Test executed after 250.00 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	> 300.00 [°C] < 800.00 [°C]		
					Ambient Temperature	>= -7.00 [°C]		
					Ambient pressure	>= 74.80 [kPa]		
					Air Control is Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature in range	> 60.00 [°C] < 124.00 [°C]		
					HP EGR Cooler bypass not active for a time	> 7.00 [s]		
					HP EGR flow in range	< 15.00 [mg/s] > 5.00 [mg/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	>= 2.00 [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	< 3,000.00 [rpm] > 1,000.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		
					No fault on HP EGR cooler downstream temperature sensor	CET_DNSS_FA==FALSE		
					No fault on Ambient Temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on HP EGR cooler inlet coolant temperature sensor	CEW_TempSnsrInFA ==FALSE		
					No fault on engine speed	CrankSensor_FA ==FALSE		
					No fault on HP EGR Cooler Bypass	CEB_ActrCktLoFA ==FALSE		

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

Air control is active if NONE of the following conditions are verified:

1. Air control is shut off due to an air system fault: AIC_AirShtOffReq==TRUE
2. Engine is ready
3. Engine is cranking
4. Air system actuators (HP EGR, LP EGR, Throttle) are not available (control shut off)
5. Zero torque condition is active (for all combustion modes except for LNT DeNOx and LNT DeSOx Rich): TRUE if Desired torque < 2.00 [Nm]. When active, it is deactivated if Desired torque >= (2.00 + 2.00) [Nm].
6. Large injected fuel condition is active:
   FALSE for SCR service check, C2, C3 DeSOx Rich, DeNOx combustion modes.
   For other combustion modes, it is TRUE if Fuel request is higher than a high threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Fuel request drops below a low threshold.

   These thresholds depend on combustion modes specific calibrations, which are function of the engine speed:

   - D1 and D3:
     - ☐ High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3** [mm^3]
     - ☐ Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3** [mm^3]
   - D2 and D4:
     - ☐ High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for D2 and D4** [mm^3]
     - ☐ Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for D2 and D4** [mm^3]
   - DeSOx Lean:
     - ☐ High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for L3** [mm^3]
     - ☐ Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for L3** [mm^3]
   - SCR modes:
     - ☐ High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for SCR** [mm^3]
     - ☐ Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for SCR** [mm^3]
   - All other modes:
     - ☐ High: **AIC_AirCntrlShtOffActn:Fuel High Threshold for others** [mm^3]
     - ☐ Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for others** [mm^3]

7. Engine Coolant Temperature too high condition is active:
   FALSE for SCR service check, DeSOx Rich, DeNOx combustion modes.
   For other combustion modes, it is TRUE if Engine Coolant Temperature is higher than a high threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Engine Coolant Temperature drops below a low threshold.

These thresholds depend on specific calibrations, related to different combustion modes:

- o DPF and HCS modes:
  - ☐ High: 129.00 [°C]
  - ☐ Low: 126.00 [°C]
- o DeSOx Lean:
  - ☐ High: 129.00 [°C]
  - ☐ Low: 126.00 [°C]
- o C3:
  - ☐ High: 129.00 [°C]
  - ☐ Low: 126.00 [°C]
- o SCR modes:
  - ☐ High: 129.00 [°C]
  - ☐ Low: 126.00 [°C]
- o All other modes:
  - ☐ High: 129.00 [°C]
  - ☐ Low: 126.00 [°C]

8. Engine Coolant Temperature too low condition is active:

If Engine coolant temperature is NOT higher than the global temperature threshold for OBDII market (OBD Coolant Enable Criteria==FALSE) AND

ECT_TooLow==TRUE:

This last condition is FALSE for SCR service check, DeSOx Rich, DeNOx combustion modes.

For other combustion modes, it is TRUE if Engine Coolant Temperature is lower than a low threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Engine Coolant Temperature goes above a high threshold.

These thresholds depend on specific calibrations, related to different combustion modes:

- o DPF and HCS modes (thresholds depending on the Outside Air Temperature):
  - ☐ High: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF** [°C]
  - ☐ Low: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF** [°C]
- o DeSOx Lean:
  - ☐ High: 13.00 [°C]
  - ☐ Low: 10.00 [°C]
- o C3:
  - ☐ High: 13.00 [°C]
  - ☐ Low: 10.00 [°C]

- o SCR modes (thresholds depending on the Outside Air Temperature):
  - ☐ High: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for SCR** [°C]
  - ☐ Low: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for SCR** [°C]
- o All other modes (thresholds depending on the Outside Air Temperature):
  - ☐ High: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others** [°C]
  - ☐ Low: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others** [°C]

9. Intake Air Temperature too high condition is active:
FALSE for DeSOx Rich, DeNOx combustion modes.
For other combustion modes, it is TRUE if Intake Air Temperature is higher than a high threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Intake Air Temperature drops below a low threshold.

These thresholds depend on specific calibrations, related to different combustion modes:

- o DPF and HCS modes:
  - ☐ High: 90.00 [°C]
  - ☐ Low: 80.00 [°C]
- o SCR service check mode:
  - ☐ High: 90.00 [°C]
  - ☐ Low: 80.00 [°C]
- o DeSOx Lean:
  - ☐ High: 90.00 [°C]
  - ☐ Low: 80.00 [°C]
- o SCR modes:
  - ☐ High: 90.00 [°C]
  - ☐ Low: 80.00 [°C]
- o All other modes:
  - ☐ High: 90.00 [°C]
  - ☐ Low: 80.00 [°C]

10. Intake Air Temperature too low condition is active:
FALSE for DeSOx Rich, DeNOx combustion modes.
For other combustion modes, it is TRUE if Intake Air Temperature is lower than a low threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Intake Air Temperature goes above a high threshold.

These thresholds depend on specific calibrations, related to different combustion modes:

- o DPF and HCS modes:
  - ☐ High: -50.00 [°C]
  - ☐ Low: -60.00 [°C]
- o SCR service check mode:
  - ☐ High: -50.00 [°C]
  - ☐ Low: -60.00 [°C]
- o DeSOx Lean:
  - ☐ High: -50.00 [°C]
  - ☐ Low: -60.00 [°C]
- o SCR modes:
  - ☐ High: -50.00 [°C]
  - ☐ Low: -60.00 [°C]
- o All other modes:
  - ☐ High: -50.00 [°C]
  - ☐ Low: -60.00 [°C]

11. Ambient pressure too low condition is active:
FALSE for DPF and HCS, SCR service check, LNT (DeNOx, DeSOx Rich and DeSOx Lean) combustion modes.
For other combustion modes, it is TRUE if Ambient Pressure is lower than a low threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Ambient Pressure goes above a high threshold.

These thresholds depend on specific calibrations, related to different combustion modes:

- o SCR modes:
  - ☐ High: 72.00 [kPa]
  - ☐ Low: 70.00 [kPa]
- o C3:
  - ☐ High: 72.00 [kPa]
  - ☐ Low: 70.00 [kPa]
- o All other modes:
  - ☐ High: 72.00 [kPa]
  - ☐ Low: 70.00 [kPa]

12. EGR control set-point request is maximum: TRUE if Air setpoint == 3,000.00 [mg]

13. Overlong idle condition is active:

FALSE for DPF, SCR service check, LNT (DeNOx, DeSOx Rich and DeSOx Lean) combustion modes.
For other combustion modes, it is TRUE if Engine Speed is lower than a threshold and this condition lasts for a calibrate-able timer.

The threshold and the timer depend on specific calibrations, related to different combustion modes:

- o SCR modes:
  - ☐ Threshold: 560.00 [rpm]
  - ☐ Timer: 409.59 [s]
- o All other modes:
  - ☐ Threshold: 560.00 [rpm]
  - ☐ Timer: 409.59 [s]

14. MAF drift intrusive test is requested:
TRUE if the MAF sensor rationality monitoring - intrusive airflow drift test is enabled (see the documentation related to P0101)

Conditions from 6 to 14 (12 excluded) are in AND with: Exhaust Gas Overtemperature NOT detected (EGT_ExhOverTemp==FALSE)

Conditions 7 and from 9 to 11 are also in AND with (EOBD market only): EGR intrusive test NOT enabled (Refer to "EGR intrusive test" Free Form)

Boost Control is in Closed Loop if NONE of the following conditions are verified:

1. Boost control is shut off due to a boost actuator fault: AIC_BstActrsDiagShtOff==TRUE
2. Engine is ready
3. Engine is cranking
4. Boost actuators (HCB, HTB, VGT, WG) are not available (control shut off):
   VGT Vacuum: VGT_PstnSnsrFA, VGT_PstnSnsrTFTKO, VGT_PstnCntrlFA, VGT_PstnCntrlTFTKO, VGT_ActCktFA, VGT_ActCktTFTKO
   VGT DC Motor: VGT_ActCktFA, VGT_ActCktTFTKO, VGT_PstnCntrlFA, VGT_PstnCntrlTFTKO, VGT_PstnSnsrCktFA, VGT_PstnSnsrCktTFTKO, VGT_PstnSnsrRatltyFlt
   WG: WGA_ActrDiagShtOff
   HCB: HCB_ActrDiagShtOff
   HTB: HTB_ActrDiagShtOff
5. Boost control is shut off due to a boost system fault: AIC_BstSysDiagShtOff==TRUE
6. Exhaust Brake functionality is active AND Exhaust Gas Overtemperature NOT detected (EGT_ExhOverTemp==FALSE)

Moreover, Boost Control is in Closed Loop if the following conditions are verified (in AND):

- Combustion mode is NOT SCR service check

- Fuel request (or Torque request, if the combustion mode is LNT DeSOx Rich or DeNOx) is higher than a “On” threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Fuel request (or Torque request) drops below a “Off” threshold.)

  These thresholds depend on specific calibrations, related to different combustion modes, which are function of the engine speed:
  - C2 and C3:
    - ☐ On: **AIC_BstCntrlCL: Fuel Request On Threshold for C2 and C3**[mm^3]
    - ☐ Off: **AIC_BstCntrlCL: Fuel Request On Threshold for C2 and C3** - 5.00 [mm^3]
  - D1, D3 and HC unloading:
    - ☐ On: **AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3**[mm^3]
    - ☐ Off: **AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3** - 5.00 [mm^3]
  - D2 and D4:
    - ☐ On: **AIC_BstCntrlCL: Fuel Request On Threshold for D2 and D4** [mm^3]
    - ☐ Off: **AIC_BstCntrlCL: Fuel Request On Threshold for D2 and D4** - 5.00 [mm^3]
  - V3:
    - ☐ On: **AIC_BstCntrlCL: Fuel Request On Threshold for V3**[mm^3]
    - ☐ Off: **AIC_BstCntrlCL: Fuel Request On Threshold for V3** - 5.00 [mm^3]
  - V2:
    - ☐ On: **AIC_BstCntrlCL: On Threshold for V2** [cmp]
    - ☐ Off: **AIC_BstCntrlCL: On Threshold for V2** - 5.00 [cmp]
  - V1:

- ☐ On: **AIC_BstCntrlCL: On Threshold for V1** [cmp]
- ☐ Off: **AIC_BstCntrlCL: On Threshold for V1 -** 5.00 [cmp]

o Default:

- ☐ On: **AIC_BstCntrlCL: Fuel Request On Threshold for others**[mm^3]
- ☐ Off: **AIC_BstCntrlCL: Fuel Request On Threshold for others -** 10.00 [mm^3]

17 OBDG04 Air Control Transition

An air control transition is active when one of the following conditions occur:
- Desired EGR rate transition from 0 % to greater than 0 %
- LP EGR (if present) control transition from closed loop on air flow to closed loop on LP EGR flow, or vice-versa: Refer to "Other AICR DSL flags" Free Form
- HP EGR control transition from closed loop on air flow to closed loop on HP EGR flow, or vice-versa: Refer to "Other AICR DSL flags" Free Form

An air control transition check is enabled when:
- Previous air control transition has ended
- Air control transition is active

After air control transition check enabling, air control transition is recognised as ENDED after a time >= **AirCntrlTrnstnEnd: Timer threshold** [s]

%%%% Throttle control active %%%%
Throttle control is active if (conditions in AND):
- Air Control is Active (Refer to "Air Control Active" Free Form)
- A manifold pressure drop is requested

%%%% Manifold pressure drop request %%%%
A Manifold pressure drop is NOT requested if air control is working only in EGR control (Desired EGR rate is 100%) and a transition is over.
A transition starts if previous Desired EGR rate <100% and ends when Throttle valve position > 50.00 [%]

%%%% HP EGR control %%%%
HP EGR control is in closed loop on air flow if (conditions in AND):
- A manifold pressure drop is not requested
- Desired LPE split is 0%
Otherwise, HP EGR control is in closed loop on HP EGR flow

%%%% LP EGR control %%%%
LP EGR control is in closed loop on air flow if (conditions in AND):
- Throttle control is active
- Desired LPE split is 100%
Otherwise, LP EGR control is in closed loop on LP EGR flow

OBD Coolant enable
Starting in 11.15A software GM has created a coordinated signal within the ECM that serves as a master enable for diagnostics/controls that use coolant as an enable condition. Controls and diagnostics may choose to enable prior to this calculated signal, but calibrating beyond the OBD limit will not function because of this signal. This enable condition is also put on the CAN bus for other modules to consume as well.

KeTHMG_b_elecstatequipd = 0 for this application

For mechanical thermostat applications (KeTHMG_b_elecstatequipd = 0)
OBD Coolant Enable Temp = P0128 Primary target temp – Calibratable offset (0-32) – 1
OBD Coolant Enable Temp = 71 - 0.0 – 1
OBD Coolant Enable Temp = 70.0

For E-stat applications (KeTHMG_b_elecstatequipd = 1)

OBD Coolant Enable Temp = Max(Min(ECT Control Temp) – Primary Warm up delta, Min primary P0128 target) – Calibratable offset (0-32) – 1
OBD Coolant Enable Temp = Max(Min(KaTHMC_T_TMS_EngCoolReq) - KaECTR_T_CTR_WrmUpDeltaTemp[0], KaECTR_T_CTR_WrmUpTargetMin[0]) - KeECTR_T_CTR_GlblMinOffst – 1
OBD Coolant Enable Temp = Max(90.5 - 19 , 71) - 0.0 – 1
OBD Coolant Enable Temp = 70.5

MEMR FNA Matched Flag

GM software maintains a flag that indicates when an ECU has been programmed. When the controller is powered on, the logic compares the application software and calibration data file part numbers and design level suffixes (DLS) that are programmed into ECU flash memory to the part number and DLS data stored in ECU non-volatile memory. If any difference in the part number or DLS values are found, the MEMR_FNA_Matched flag is set to FALSE, otherwise the flag is set to TRUE.

RAIL PRESSURE CONTROL DEFINITIONS

'***Rail pressure is governed by Fuel Metering Unit***' when current control state is one of following:
- '*Open Loop with Metering Unit*'
- '*Closed Loop with Metering Unit*'
- '*From PR to MU 2nd stage*'

'***Fuel Metering Unit controlled in closed loop***' when current control state is one of following:
- '*Closed Loop with Metering Unit*'
- '*From PR to MU 2nd stage*'
- changing into '*From MU to PR*'

'***Rail pressure is governed by Pressure Regulator***' when current control state is one of following:
- '*Open Loop with Pressure Regulator*'
- '*Closed Loop with Pressure Regulator*'
- '*From PR to MU 1st stage*'
- '*From MU to PR*'

'***Pressure Regulator controlled in closed loop***' when current control state is one of following:
- '*From PR to MU 1st stage*'
- '*Closed Loop with Pressure Regulator*'
- '*From MU to PR*'
- changing into '*From PR to MU 2nd stage*'

'**Maximum fuel flow deliverable by high pressure pump'** (mm^3/str) =
1,226.0 * (1.00 * Engine speed) * (**P228A Fuel High Pressure Pump efficiency** table/ 100) *
* **P228A Fuel High Pressure Pump efficiency correction** table / 60

RAIL PRESSURE CONTROL STATES

'***Open Loop with Metering Unit***':
(Current control state is '*Init*' AND
Engine is not required to shut off AND
Pressure governor selected is '*Metering Unit*' AND

Metering Unit Valve is present)
OR
(Current control state is '*Closed Loop with Metering Unit*' AND
Rail Pressure < 25 MPa AND
Engine speed < 100 rpm AND
Engine is not required to shut off)

'***Closed Loop with Metering Unit***':
(Current control state is '*Open Loop with Metering Unit*' AND
Rail Pressure > 20 MPa AND
Engine speed > 400 rpm A ND
Engine is not required to shut off)
OR
(Current control state is '*From PR to MU 2nd stage*' AND
Pressure Regulator command ramped to completely closed position AND
Engine is not required to shut off)

'***From MU to PR***':
(Current control state is '*Closed Loop with Metering Unit*' AND
Pressure governor selected is '*Pressure Regulator*' AND
Engine is not required to shut off AND
Pressure Regulator is present)

'***Open Loop with Pressure Regulator***':
(Current control state is '*Init*' AND
Engine is not required to shut off AND
Pressure governor selected is '*Pressure Regulator*' AND
Pressure Regulator is present)
OR
[Current control state is '*Closed Loop with Pressure Regulator*' AND
(Rail Pressure < 25 MPa AND
Engine speed < 100 rpm AND
Engine is not required to shut off)
OR
FHP_RPS_Flt = TRUE]

'***Closed Loop with Pressure Regulator***':

(Current control state is '*Open Loop with Pressure Regulator*' AND
Rail Pressure > 20 MPa AND
Engine speed > 400 rpm AND
Engine is not required to shut off AND
FHP_RPS_Flt = FALSE)
OR
(Current control state is '*From MU to PR*' AND
Metering Unit command ramped to completely opened position AND
Engine is not required to shut off)

'***From PR to MU 1st stage***':
(Current control state is 'Closed Loop with Pressure Regulator' AND
Pressure governor selected is 'Metering Unit' AND
Engine is not required to shut off AND
Metering Unit Valve is present)

'***From PR to MU 2nd stage***':
(Current control state is '*From PR to MU 1st stage*' AND
Timer for transitioning ≥ 1 * 6.25 ms AND
Engine is not required to shut off)

'***Init***':
ECM reset

'***ESO***':
Engine is required to shut off

RAIL PRESSURE CONTROL SELECTOR

'***Metering Unit***' is selected as pressure governor when:
(Pressure governor selected is '*Metering Unit*')
OR
{ Pressure governor selected is '*Pressure* Regulator' AND
Rail Pressure Control Configuration = CeFHPG_e_MU_And_PR_ModeSel AND
FHP_MU_CtrlModeInhb = FALSE AND

[FHP_PR_CtrlModeInhb = TRUE OR
(Engine speed > 448 rpm AND
(Fuel temperature > 0 °C OR
FHP_PR_FuelTempLimEnbl = TRUE) AND
FHP_PresStdySt = TRUE AND
Powertrain relay requested on AND
FHP_FuelRailDischargeReq = TRUE)] }

where FHP_NoRailDischarge is defined as follows:
If { [(Fuel temperature > 60.0 °C) OR FTS_FTS_Flt] AND (ZeroTorqPrdtdActv OR ZeroTorq) } then
(Rail pressure setpoint gradient ≥ -40.00 MPa for at least 255 * 6.25 ms)
Else
(ZeroTorqPrdtdActv = FALSE AND ZeroTorq = FALSE)

'***Pressure Regulator***' is selected as pressure governor when:
(Pressure governor selected is '*Pressure Regulator*')
OR
{ Pressure governor selected is '*Metering Unit*' AND
Rail Pressure Control Configuration = CeFHPG_e_MU_And_PR_ModeSel AND
FHP_PR_CtrlModeInhb = FALSE AND
[FHP_MU_CtrlModeInhb = TRUE OR
(FHP_PresOfst = TRUE AND
ZeroTorqPrdtdActv = TRUE AND
ZeroTorq = TRUE) OR
(Powertrain relay requested on AND
FHP_PR_FuelTempLimEnbl = FALSE AND
(Fuel temperature < -10 °C OR
Engine speed < 428 rpm))] }

1) **DPF_CCB_Crtn** is the soot correction calculated by Configurable Correction Block (CCB) model.
CCB is enabled if:
- DPF_EnblDPF = 0
- NOx mass flow upstream the DPF is above 0.02 (With Hysteresis 0.02)
- Inner DPF Temperature estimated through temperature sensors or a thermal model is inside the range identified by 220.00 - 225.00 and 600.00 - 600.00 .
- The percentage valued of ranked soot model is above the product between **DPF_CCB_SootThrsh** and **DPF_SootThrshCrtn.**

2) The Resistive flow calculation is disabled**, DPF_ResistFlowCalcOff** = 1, if one of those conditions is fulfilled for calibratable debouncing time 0.00 [sec]:
- DPF Differential pressure sensor reading is below 1.00 [KPa]
- Estimated exhaust gas volume flow rate is below 25.00 [l/s]
- DPF_FR_CalcDsbl and 0.00 are both = 1
. Derivative of pressure drop across the DPF is above 5.00 [KPa/sec]
- DPF_LastRgnAvg is below -1.00
- Fuel Request is outside the range identified by **DPF_ResistFlowDsblLo** and **DPF_ResistFlowDsblHi**
- The regeneration is on going and with the DPF upstream tempearture greater than **DPF_EffRgnHysHi** (with hysteresys **DPF_EffRgnHysLo**)

3) DPF_ResistFlowFltd

It is the Filtered exhaust gas resistive flow, that indicates the amount of soot present inside in the DPF.
The flow resistance depends on Pressure difference measured by exhaust pressure sensor(EGP) , between upstream and downstream DPF, and Exhaust Flow.
The Filtered Flow Resistance is filtered by a low pass filter with a calibratable time constant in order to obtain the mean value for diagnostic purposes**.**

4) EGT_Avg

Reference Temperature, **EGT_Avg**, at system start up is definited as:
The reference temperature at system start-up is an average calculation done using all temperature sensors present in the system. The usage of each temperature in the average calculation shall be decided via calibration (one for each sensor) and only if the sensor is no faulty.
The reference temperature shall be calculated only if all the following conditions are fulfilled:
- System supplied but engine still not running (also crack phase excluded). If after the crank phase the engine is not running but it is turned back to key on state the calculation shall be disable for a calibratable time
- Time from the last engine shutdown greater than a calibratable threshold(28,800.00)
- At least four sensor are available for the reference temperature calculation
- If after the crank phase the engine is not running but it is turned back to key on state the calculation shall be disable until the engine will run

The reference temperature shall be calculated as following:
T_AvrKeyOn= ((∑T_i) - T_Max- T_Min) / (n-2)

where:
T_i : i-th system temperature
T_Max: Maximum temperature read
T_Min: Minimum temperature read
n: number of temperature sensors used for the reference temperature calculation

5) EGT_CatHtEnbl
VeEGTC_b_CatHtEnbl = 1 if:
- Combustion Mode equal to one of allowed modes (DPF, HCS, SCR Service Bay Test) OR with <KeEGTC_b_CatHtCombModeEnbl>
- Fuel Request inside calibratable range: FueRequested < **EGT_FuelReqMaxThreshold** and FuelRequested > **EGT_FuelReqMinThrsh** with hysteresis)
- Catalyst Up Temperature Sensor (EGT1) < 700.00 [°C] AND with Catalyst Up Control PID > 0 [mm3]
- No Fault on Catalyst Up Temperature Sensor: EGT_SnsrCatUpFlt
- One of two actuators (After Injection - Air Mass/Boost Pressure) available: After injection actuation enabled if 0.00 = 1 and no injection system fault is present (FUL_GenericInjSysFlt). Air Mass/Boost Pressure actuation enabled if 0.00 = 1 and either air control (AIC_AirCntrlShtOffAction) is not disabled by fault or boost control (AIC_BstCntrlCL) is not disabled.

6) EGT_DsblCL
VeEGTC_e_DsblCL == CeEGTC_e_AllCondEnblCL (CLC Enabled) if:
- Combustion Mode equal to one of allowed modes (DPF, DeSOx Lean)
- Post Injection is enabled (FUL_PostEnbl)
- Post Injection shall be currently released or Post Release Check shall be disabled (0.00)
- If Post Release Check is enabled (0.00) , Post Injection shall be enabled (FUL_PostEnbl) and it shall be currently released or not released for less than a calibratable debouncing time (1.00) while post injection open loop plus previous closed loop quantity are not below a minimum quantity -1.00 .
- Fuel Request above calibratable range : Fuel Requested > **EGT_FuelReqHysHiThrsh_DPF** with hysteresis **EGT_FuelReqHysLoThrsh_DPF**
- Catalyst Down Temperature Sensor < 700.00 [°C] AND with Post Injection Control PID > 0 [mm3]
- No Fault on Catalyst Down Temperature Sensor (EGT_SnsrCatDwnFlt)

17 OBDG04 Definitions

Acronyms:
SQA: Small quantity adjustment
(x)SQA: Extrapolated SQA or Target Small Quantity Adjustment
SQO: Small Quantity adjustment Oxygen Based
SSQA: Suspicious Small Quantity Adjustment
VSQA: Validation Small Quantity Adjustment
SQL: Small Quantity Learning
IIL: Idle Injection Learning
CB: Cylinder Balancing
FSA: Fuel Setpoint Adaptation
CWA: Crank-Wheel Adaptation
EIA: End Of Line Injector Adjustment.
MEC: Manufacturer Enable Counter. This counter becomes zero when the vehicle exit the assembly plant.
LoresC Task: 1 sample every cylinder firing event (e.g. 180 deg of angular rotation on a 4 cylinders engine).

FAD_SQA_InjMgntEnbld (VeFADC_b_SQA_InjMgntEnbld):

XSQA Learning Enabled via calibration = 1.00
OR
SQC Enabled via calibration 1.00
Fuel Rail Discharge Request Not active FHP_FuelRailDischargeReq
Cumulative Fuel Request (Hot Chamber detection) >= 16,000.00 [mm3]

Increased during fuel injection and decreased, based on intake manifold air flow, during diesel fuel cut-off condition.
Air actuators delay time during zero torque before enable SQA (air actuators ready) >= 0.50 [s]

No active DTCs:FAD_SQC_LrnShtOffReq
No Fuel Rail Setpoint limited due to fuel overtemperature FHP_SetPtLimByFuelTemp

No Fuel Injected FUL_FuelInjected

SQA rail pressure value steady state (SQA Rail Pressure Set Point +/-**KaFADC_p_SQA_LrnDelt**)
conditions for time >= 0.20 [s] (rail pressure steady-state conditions)

Combustion mode = **KaFADC_b_SQA_EnblCMBR**[Boolean]

Engine coolant temperature > 68.00 [°C] < AND < 126.00 [°C]
Hysteresis on Engine coolant temperature = 1.50 [°C]

Fuel temperature > 0.00 [°C]AND < 70.00 [°C]
Hysteresis on Fuel temperature = 1.00 [°C]

CWA correction active in current and lower engine speed range.
Checked only if SQA and CWA are linked via calibration = 1.00 [boolean]
CWA learned in the following engine speed ranges **KaFADC_b_SQC_CWA_EnblLink**

Engine Speed < **KaFADC_n_SQC_HiThrsh**(Gear, Rail Pressure level) [rpm] AND > **KaFADC_n_SQC_LoThrsh** (Gear, Rail Pressure level) [rpm]
Hysteresis on Engine Speed= 10.00 [rpm]

Driveline steady state condition: Time from last gear shift > 1.00 [s]

SQA noise check (rough road detection) not failed less than 3.00 fail samples out of

15.00 samples.

Manifold Air Pressure (for Injection quantity and timing monitoring) < **KtFADD_p_XSQA_MAP_HiThrsh**(Engine Speed) [kPa]
Hysteresis on Manifold Air Pressure Threshold (for Injection quantity and timing monitoring) = 2.00 [kPa]
OR
Manifold Air Pressure (for SQA Control) < **KtFADC_p_SQA_MAP_HiThrsh**(Engine Speed) [kPa]
Hysteresis on Manifold Air Pressure Threshold (for SQA Control) = 2.00 [kPa]

No inhibit request during O2 increasing dynamic check:
P013A is not in timer evaluation state (Checked only if SQA inhibit during test execution is enabled via calibration 1.00)
AND
P014C is not in timer evaluation state (Checked only if SQA inhibit during test execution is enabled via calibration 0.00)
See P013A and P014C for details.

Diesel Fuel Cut-off conditions fulfilled for time > 0.20 [s]
AND
No CWA, SDC or OPA learning active.

Gears: 4, 5, 6

In case of automatic transmission:
TCC status: Locked or Controlled slip

In case of AWD:
Enabled in AWD o 2WD, not enabled with low ratio gears.

Power Take Off not active

AND

Boolean Flag used to disable SQA in case of power take off active 0.00

FAD_SQA_LrnPresEnbl (VeFADR_b_SQA_LrnPresEnbl):

XSQA Learning Enabled via calibration = 1.00

OR

SQC Enabled via calibration 1.00

Cumulative Fuel Request (Hot Chamber detection) >= 16,000.00 [mm3]

Increased during fuel injection and decreased, based on intake manifold air flow, during diesel fuel cut-off condition.

No active DTCs: FAD_SQC_LrnShtOffReq

Combustion mode= **KaFADC_b_SQA_EnblCMBR**[Boolean]

Engine coolant temperature > 68.00 [°C] < AND <126.00 [°C]
Hysteresis on Engine coolant temperature = 1.50 [°C]

Fuel temperature > 0.00 [°C]AND < 70.00 [°C]
Hysteresis on Fuel temperature = 1.00 [°C]

CWA correction active in current and lower engine speed range.
Checked only if SQA and CWA are linked via calibration = 1.00 [boolean]
CWA learned in the following engine speed ranges **KaFADC_b_SQC_CWA_EnblLink**

Engine Speed range < **KaFADC_n_SQC_HiThrshDelt** + **KaFADC_n_SQC_HiThrsh**[rpm] AND > **KaFADC_n_SQC_LoThrsh** [rpm]
Hysteresis on Engine Speed= 10.00 [rpm]

Driveline steady state condition: Time from last gear shift > 1.00 [s]

Manifold Air Pressure (for Injection quantity and timing monitoring) < **KtFADD_p_XSQA_MAP_HiThrsh**(Engine Speed) [kPa]
Hysteresis on Manifold Air Pressure Threshold (for Injection quantity and timing monitoring) = 2.00 [kPa]

OR

Manifold Air Pressure (for SQA Control) < **KtFADC_p_SQA_MAP_HiThrsh**(Engine Speed) [kPa]

Hysteresis on Manifold Air Pressure Threshold (for SQA Control) = 2.00 [kPa]

Diesel Fuel Cut-off conditions fulfilled for time > 0.20 [s]

AND
No CWA (Crank-Wheel Adaptation), SDC(Sensor Drift Compensation) or OPA(Oxygen Pressure Adaptation) learning active.

Gears: 4, 5, 6
In case of automatic transmission:
TCC status: Locked or Controlled slip
In case of AWD:
Enabled in AWD o 2WD, not enabled with low ratio gears.

FAD_XSQA_LrnCondEnbl (VeFADC_b_XSQA_LrnCondEnbl):

XSQA Learning Enabled via calibration = 1.00

Fuel Rail Discharge Request Not active: FHP_FuelRailDischargeReq

Cumulative Fuel Request (Hot Chamber detection) >= 16,000.00 [mm3]

Increased during fuel injection and decreased, based on intake manifold air flow, during diesel fuel cut-off condition.

Air actuators delay time during zero torque before enable SQA (air actuators ready) >= 0.50 [s]

No active DTCs: FAD_SQC_LrnShtOffReq

No Fuel Rail Setpoint limited due to fuel overtemperature FHP_SetPtLimByFuelTemp

No Fuel Injected FUL_FuelInjected

SQA rail pressure value steady state (SQA Rail Pressure Set Point +/-**KaFADC_p_SQA_LrnDelt**)

conditions for time >= 0.20 [s] (rail pressure steady-state conditions)

Combustion mode = **KaFADC_b_SQA_EnblCMBR**[Boolean]

Engine coolant temperature > 68.00 [°C] < AND < 126.00 [°C]

Hysteresis on Engine coolant temperature = 1.50 [°C]

Fuel temperature > 0.00 [°C] AND < 70.00 [°C]

Hysteresis on Fuel temperature = 1.00 [°C]

CWA correction active in current and lower engine speed range.

Checked only if SQA and CWA are linked via calibration = 1.00 [boolean]

CWA learned in the following engine speed ranges **KaFADC_b_SQC_CWA_EnblLink**

Engine Speed < **KaFADC_n_SQC_HiThrsh** (Gear, Rail Pressure level) [rpm] AND > **KaFADC_n_SQC_LoThrsh** (Gear, Rail Pressure level) [rpm]

Hysteresis on Engine Speed= 10.00 [rpm]

Driveline steady condition: Time from last gear shift > 1.00 [s].

SQA noise check (rough road detection) not failed less than 3.00 fail samples over 15.00 samples.

Manifold Air Pressure < **KtFADD_p_XSQA_MAP_HiThrsh** [Engine Speed]

Hysteresis on Manifold Air Pressure Threshold = 2.00

No inhibit request during O2 increasing dynamic check:

P013A is not in timer evaluation state (Checked only if SQA inhibit during test execution is enabled via calibration 1.00)

AND

P014C is not in timer evaluation state (Checked only if SQA inhibit during test execution is enabled via calibration 0.00)

See P013A and P014C for details.

Diesel Fuel Cut-off conditions fulfilled for time > 0.20 [s]

AND

No CWA (Crank-Wheel Adaptation), SDC (Sensor Drift Compensation) or OPA (Oxygen Pressure Adaptation) learning active.

Gears: 4, 5, 6

In case of automatic transmission:

TCC status: Locked or Controlled slip

In case of AWD:

Enabled in AWD o 2WD, not enabled with low ratio gears.

FAD_CB_CntrlType (VeFADC_e_CB_CntrlType):

CB Enabled Via Calibration 1.00 [boolean]

No active DTCs: FAD_CB_ShtOffReq

Fuel Injectors not disabled FUL_InjectorDisable
Power Take Off not active

Comustion Mode = **KaFADC_b_CB_EnblCMBR**

No CB ShutOff Request for Max Authority Reached FAD_CB_MaxAutShutOff

No CB ShutOff Request for wind-up:

Corrections saturated on 9.00 cylinders for 255.00 [Cylinder firing event] (soft shut-off)

OR

Correction saturated on 9.00 cylinders (hard shut-off)

Engine is running

Cylinder balancing not disabled during SQL(Small Quantity Adjustment)/IIL(Idle Injection Learning) Learning

Delay samples from cranking elapsed = 8.00 + 50.00 [Cylinder Firing Events]

In case of AWD:
Enabled in AWD o 2WD, not enabled with low ratio gears.

Fuel Request > 4.00

AND

Fuel Request < **KtFADC_V_CB_HiThrshFuelQnty**

If Cylinder Balancing and CWA are linked in both low engine speed range 0.00 AND high engine speed range 1.00 :

If CWA is not learnt:

CB Closed loop not active

If CWA learnt only in Low Engine speed range:

Engine speed > Desired Idle engine speed - 30.00 [rpm]

AND

Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh2**

If CWA learnt only in High Engine speed range:

Engine Speed > **KaFADC_n_CB_EngSpdRngThrsh2**

AND

Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh3**

If CWA learnt on both high and low engine speed ranges:

Engine speed > Desired Idle engine speed - 30.00

AND

Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh3**

If Cylinder Balancing and CWA are linked on low engine speed range 0.00 AND high engine speed range 1.00 ==0:

If CWA has not learnt on Low Engine speed range:

Engine Speed > **KaFADC_n_CB_EngSpdRngThrsh2**
AND
Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh3**

If CWA learnt only on low engine speed ranges:

Engine speed > Desired Idle engine speed - 30.00
AND
Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh3**

If Cylinder Balancing and CWA are linked only on High engine speed range 0.00 ==0 AND high engine speed range 1.00 :

If CWA has not learnt on High Engine speed range:

Engine speed > Desired Idle engine speed - 30.00

AND
Engine Speed > **KaFADC_n_CB_EngSpdRngThrsh2**

If CWA learnt only on high engine speed ranges:

Engine speed > Desired engine speed - 30.00
AND
Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh3**

If Cylinder Balancing and CWA are not linked on both low engine speed range 0.00 ==0 AND high engine speed range 1.00 ==0:

Engine speed > Desired Idle engine speed - 30.00
AND
Engine Speed < **KaFADC_n_CB_EngSpdRngThrsh3**

FAD_DFSA_EnblLrn (VeFADC_b_DFSA_EnblLrn):

Enabled by calibration: 1

Engine is running

FSA learning is not active: refer to control flag in "FSA Control Flag" Free Form FAD_FSA_EnblLrn== FALSE

O2 sensor is fully operative: OXY_eqr_TurbDwnNotRlb == FALSE

Enabled in combustion mode: refer to supporting table (**KaFADC_b_FSA_EnblCombMode**)

Power Take-Off (PTO) is not active

(OBD Coolant Enable Criteria == TRUE
OR
Engine coolant temperature > 45.00 [°C])

Engine coolant temperature < 117.00 [°C]

Fuel temperature in range: > -10.00 [°C]
< 90.00 [°C]

Ambient air pressure > 67.00 [kPa]

Intake air temperature in range: > -7.00 [°C]
< 78.00 [°C]

No Post released

No After injection released when Boolean flag used to enable After injection check is FALSE: 0

Engine speed in range: > 600.00 [rpm]
< 3,200.00 [rpm]

Equivalence Ratio in range: > 0.15 [-]
< 0.85 [-]

Difference between fuel estimation and fuel injected quantity < 64.00 [mm^3]
for a time > 0.00 [s]

Injected fuel quantity variation < 0.20 [mm^3]
for a time > 0.50 [s]

Injected fuel quantity > 3.30 [mm^3]
for a time > 2.00 [s]

Injected fuel quantity < refer to supporting table (**KtFADC_V_FSA_MaxFuelFall**) [mm^3]

Engine speed variation < refer to supporting table (**KaFADC_n_DFSA_EngSpdThrsh**) [rpm]
for a time > 0.25 [s]

Intake air mass variation < 3.00 [mg]
for a time > 0.25 [s]

No pending or confirmed DTCs: FAD_FSA_LrnShtOffReq, FAD_DFSA_LrnShtOffReq, OXY_eqr_TurbDwn_FSA_NotVld

----

FAD_FSA_EnblLrn (VeFADC_b_DFSA_EnblLrn):

Enabled by calibration: 1

Engine is running

O2 sensor is fully operative: OXY_eqr_TurbDwnNotRlb== FALSE

Enabled in combustion mode: refer to supporting table(**KaFADC_b_FSA_EnblCombMode**)

Power Take-Off (PTO) is not active

(OBD Coolant Enable Criteria == TRUE
OR
Engine coolant temperature > 45.00 [°C])

Engine coolant temperature < 117.00 [°C]

Fuel temperature in range: > -10.00 [°C]
< 90.00 [°C]

Ambient air pressure > 67.00 [kPa]

Intake air temperature in range: > -7.00 [°C]
< 78.00 [°C]

No Post released

No After injection released when Boolean flag used to enable After injection check is FALSE: 0

Engine speed in range: > 600.00 [rpm]
< 3,200.00 [rpm]

Equivalence Ratio in range: > 0.15 [-]
< 0.85 [-]

Difference between fuel estimation and fuel injected quantity < 64.00 [mm^3]
for a time > 1.00 [s]

Injected fuel quantity variation < 0.09 [mm^3]
for a time > 1.40 [s]

Injected fuel quantity > 3.30 [mm^3]
for a time > 2.00 [s]

Injected fuel quantity < refer to supporting table(**KtFADC_V_FSA_MaxFuelFall**) [mm^3]

Engine speed variation < refer to supporting table(**KaFADC_n_FSA_EngSpdThrsh**) [rpm] for a time > 0.40 [s]

No pending or confirmed DTCs: FAD_FSA_LrnShtOffReq, OXY_eqr_TurbDwn_FSA_NotVld

----

FAD_FSA_NormRngCrtnValid (VeFADR_b_FSA_NormRngCrtnValid):

Not disabled by calibration: 0

No pending or confirmed DTCs: FAD_FSA_NormRngShtOffReq

Enabled in combustion mode = refer to supporting table(**KaFADC_b_FSA_CombModeEnblRls**)

Low Fuel Condition Diagnostic flag

Flag set to TRUE if the fuel level < 10.0 % AND

No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds

Transfer Pump is Commanded On Flag

Fuel Volume in Primary Fuel Tank < 0.0 liters AND

Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND

Transfer Pump on Time < P0461, P2066, P2636: Transfer Pump Enable (see supporting table for numeric value) AND

Transfer Pump had been Off for at least 0.0 seconds AND

Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running AND

Engine Running

P0101 - Mass Air Flow (MAF) Sensor Performance

Engine is working in IDLE condition if:

- Engine speed > 560.00 [rpm] AND Engine speed < 1,000.00 [rpm]

- Intake manifold pressure > 69.60 [kPa] AND Intake manifold pressure < 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

- All conditions above are verified for a time >= 2.00 [s]

Engine is working in HIGH LOAD condition if:

- Engine speed > 1,200.00 [rpm] AND Engine speed < 3,000.00 [rpm]
- Intake manifold pressure > 140.00 [kPa] AND Intake manifold pressure < 320.00 [kPa]
- Intake manifold pressure is in steady state (SS): when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, |Intake manifold pressure - p_ref| < 5.00 [kPa] for maintaining the SS ON

- Intake manifold temperature > 10.00 [°C] AND Intake manifold temperature < 90.00 [°C]
- All conditions above are verified for a time >= 2.50 [s]

Engine is working in OVERRUN condition if:
- Engine speed > 1,075.00 [rpm] AND Engine speed < 2,800.00 [rpm]
- Intake manifold pressure > 69.60 [kPa] AND Intake manifold pressure < 140.00 [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| < 4.00 [kPa] for maintaining the SS ON
- Intake manifold temperature > 0.00 [°C] AND Intake manifold temperature < 60.00 [°C]
- No fault on the intake manifold temperature sensor: MnfdTempSensorFA== FALSE

- Zero torque condition active: TRUE if Desired torque < 2.00 [Nm]. When active, it is deactivated if Desired torque >= 2.00 + 2.00 [Nm].
- All conditions above are verified for a time >= 0.20 [s]

Initial Supporting table - Down Stream Stk Temp Vrtn

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

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

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

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
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	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
35	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
45	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
55	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
65	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

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	19.9	20.0	50.0	50.1	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	0.0	0.0	0.0
2,000.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
2,001.0	0.0	0.0	0.0	0.0	0.0	0.0	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	850	900	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
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	850	900	1,100	1,200	1,800	2,000	2,800	3,500
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

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

Initial Supporting table -KaFADC_b_FSA_CombModeEnblRls

Description: Enable FSA correction release in a specific combustion mode

KaFADC_b_FSA_CombModeEnblRls - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaFADC_b_FSA_CombModeEnblRls - Part 3

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

KaFADC_b_FSA_CombModeEnblRls - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaFADC_b_FSA_EnblCombMode

Description: Enable FSA learning in a specific combustion mode

KaFADC_b_FSA_EnblCombMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaFADC_b_FSA_EnblCombMode - Part 3

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

KaFADC_b_FSA_EnblCombMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
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	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	

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	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	

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	143	110	102	91	100

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	-143	-110	-102	-91	-100

Initial Supporting table -KaOXYD_b_NOx1_IncrDynChkCmbEnbl

Description: This array indicates what are the combustion mode in which Increasing Dynamic Check Diagnosis is enabled

KaOXYD_b_NOx1_IncrDynChkCmbEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1_IncrDynChkCmbEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx1_IncrDynChkCmbEnbl - Part 3

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

KaOXYD_b_NOx1_IncrDynChkCmbEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1_IncrDynChkCmbEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table -KaOXYD_b_NOx1LoadChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Full Load condition is enabled

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

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

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Overrun condition is enabled

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	1	1	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	1	0			

Initial Supporting table - KaOXYD_b_NOx2_DecrDynChkCmbEnbl

Description: This array indicates what are the combustion mode in which Decreasing Dynamic Check Diagnosis is enabled

KaOXYD_b_NOx2_DecrDynChkCmbEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx2_DecrDynChkCmbEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx2_DecrDynChkCmbEnbl - Part 3

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

KaOXYD_b_NOx2_DecrDynChkCmbEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx2_DecrDynChkCmbEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table -KaOXYD_b_NOx2_IncrDynChkCmbEnbl

Description: This array indicates what are the combustion mode in which Increasing Dynamic Check Diagnosis is enabled

KaOXYD_b_NOx2_IncrDynChkCmbEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx2_IncrDynChkCmbEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx2_IncrDynChkCmbEnbl - Part 3

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

KaOXYD_b_NOx2_IncrDynChkCmbEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx2_IncrDynChkCmbEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	1	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	1	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	190	190	190	190	190

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	60	70	80	100	120	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	10	20	30	40	50	60	70	80	100	120
450	35	35	35	35	35	35	35	35	35	35
700	35	35	35	35	35	35	35	35	35	35
950	35	35	35	35	35	35	35	35	35	35
1,200	35	35	35	35	35	35	35	35	35	35
1,450	35	35	35	35	35	35	35	35	35	35
1,700	35	35	35	35	35	35	35	35	35	35
1,950	35	35	35	35	35	35	35	35	35	35
2,200	35	35	35	35	35	35	35	35	35	35

Initial Supporting table -KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	10	20	30	40	50	60	70	80	100	120
450	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
700	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
950	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,200	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,450	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,700	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,950	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
2,200	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35

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	2,500	3,000	3,250
1	0	30	60	70	100	120	110	80	80	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	-100	-70	-51	-50	-20	0	20	50	51	70	100
-100	0	0	0	100	100	100	100	100	0	0	0
-70	0	0	0	100	100	100	100	100	0	0	0
-51	0	0	0	100	100	100	100	100	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
50	0	0	0	100	100	100	100	100	0	0	0
51	0	0	0	100	100	100	100	100	0	0	0
70	0	0	0	100	100	100	100	100	0	0	0
100	0	0	0	100	100	100	100	100	0	0	0

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrsh

Description: Map used to define FSA emission correlated maximum threshold

Value Units: mm^3

y/x	0	1	2	3	4	5	6	7	8	9
0	35	35	35	35	35	35	35	35	35	35
1	35	35	35	35	35	35	35	35	35	35
2	35	35	35	35	35	35	35	35	35	35
3	35	35	35	35	35	35	35	35	35	35
4	35	35	35	35	35	35	35	35	35	35
5	35	35	35	35	35	35	35	35	35	35
6	35	35	35	35	35	35	35	35	35	35
7	35	35	35	35	35	35	35	35	35	35

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrsh

Description: Map used to define FSA emission correlated minimum threshold

Value Units: mm^3

y/x	0	1	2	3	4	5	6	7	8	9
0	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
2	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
3	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
4	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
5	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
6	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
7	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35

Initial Supporting table - NOX_NOx1_DecrDynCmbMode

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

NOX_NOx1_DecrDynCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_NOx1_DecrDynCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

NOX_NOx1_DecrDynCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_NOx1_DecrDynCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
1	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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

NOX_NOx1_IncrDynCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S1_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S1_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
1	1	1	1	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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S1_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S1_OutRngMaxCmbMode - Part 4

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

Initial Supporting table -NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OOR low monitor

NOX_S1_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S1_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S1_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S1_OutRngMinCmbMode - Part 4

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

Initial Supporting table - NOX_S1_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S1_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S1_StBitChkEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S2_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
1	1	1	1	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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

NOX_S2_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 4

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

Initial Supporting table -NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OOR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S2_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S2_OutRngMinCmbMode - Part 4

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

Initial Supporting table - NOX_S2_SlowRespChkCmbEnbl

Description:

NOX_S2_SlowRespChkCmbEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S2_SlowRespChkCmbEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S2_SlowRespChkCmbEnbl - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S2_SlowRespChkCmbEnbl - Part 4

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

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	1

NOX_S2_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S2_StBitChkEnblCmbMode - Part 4

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

Initial Supporting table - P0106, P2227, P227B, P00C7: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured air flow.

Value Units: kPa
X Unit: g/s

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

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck diagnostic.

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

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

Initial Supporting table - 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	3,400
4	0.22	0.28	0.34	0.29	0.41	0.60	1.80	0.79	0.43	0.75	0.70	0.63	0.52	0.44	0.39	0.42	0.71
8	0.20	0.27	0.34	0.38	0.42	0.73	0.91	0.81	0.43	0.58	0.56	0.63	0.52	0.44	0.39	0.42	0.71
12	0.21	0.29	0.34	0.40	0.43	0.68	0.76	0.73	0.51	0.52	0.46	0.54	0.42	0.43	0.41	0.42	0.71
18	0.21	0.28	0.35	0.42	0.43	0.75	0.71	0.81	0.63	0.52	0.41	0.43	0.38	0.42	0.42	0.43	0.72
22	0.21	0.28	0.35	0.42	0.43	0.75	0.71	0.81	0.71	0.51	0.37	0.38	0.33	0.38	0.44	0.47	0.65
24	0.21	0.28	0.35	0.43	0.43	0.79	0.68	0.81	0.75	0.53	0.36	0.38	0.32	0.38	0.43	0.46	0.67
30	0.21	0.28	0.35	0.43	0.43	0.82	0.73	0.90	0.82	0.53	0.35	0.35	0.29	0.40	0.44	0.54	0.67
60	0.21	0.28	0.35	0.44	0.43	0.85	0.73	0.92	0.93	0.52	0.30	0.30	0.26	0.37	0.45	0.58	0.58
98	0.27	0.29	0.35	0.45	0.43	0.87	0.73	0.93	0.98	0.52	0.29	0.28	0.24	0.36	0.46	0.63	0.56

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	3,400
4	-0.96	-0.94	-0.98	-0.98	-0.95	-0.79	-0.99	-0.86	-0.91	-0.35	-0.75	-0.70	-0.95	-0.85	-0.90	-0.95	-0.42
8	-1.07	-0.99	-0.95	-0.92	-0.86	-0.83	-0.90	-0.84	-0.91	-0.75	-0.97	-0.70	-0.94	-0.78	-0.80	-0.95	-0.42
12	-1.08	-0.99	-0.89	-0.87	-0.83	-0.81	-0.86	-0.99	-0.97	-0.87	-0.98	-1.02	-1.03	-0.95	-1.04	-0.95	-0.37
18	-1.16	-1.02	-0.91	-0.85	-0.83	-0.84	-0.84	-1.03	-0.93	-0.83	-0.89	-1.04	-0.97	-0.97	-1.02	-0.99	-0.47
22	-1.17	-1.02	-0.90	-0.85	-0.83	-0.87	-0.81	-0.98	-0.93	-0.91	-0.90	-1.16	-1.06	-0.97	-1.00	-1.03	-0.62
24	-1.18	-1.02	-0.90	-0.84	-0.82	-0.89	-0.80	-0.98	-0.90	-0.94	-0.93	-1.26	-1.10	-0.99	-0.98	-1.00	-0.67
30	-1.19	-1.02	-0.90	-0.83	-0.82	-0.86	-0.75	-0.98	-0.90	-0.92	-0.91	-1.36	-1.16	-0.95	-0.92	-0.87	-0.75
60	-1.20	-1.02	-0.89	-0.82	-0.81	-0.86	-0.72	-0.89	-0.87	-0.94	-0.87	-1.45	-1.20	-0.94	-0.93	-0.82	-0.88
98	-1.21	-1.00	-0.88	-0.81	-0.80	-0.86	-0.72	-0.95	-0.90	-0.94	-0.89	-1.51	-1.22	-0.94	-0.93	-0.79	-1.00

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	3	3	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 High Threshold for SCR

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during SCR combustion modes. 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: ECT Too Low Hysteresis Low Threshold for SCR

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during SCR combustion modes. 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 High Oxygen, DPF parking neutral and SCR service warm up 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	60	60	60	60	60	60	60	60

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D2 and D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF Low Oxygen and 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 High Threshold for L3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DeSOx Lean 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 High Threshold for SCR

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during SCR 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	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 High Oxygen, DPF parking neutral and SCR service warm up 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	50	50	50	50	50	50	50	50

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D2 and D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF Low Oxygen and 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_AirCntrlShtOffActn: Fuel Low Threshold for L3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DeSOx Lean 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_AirCntrlShtOffActn: Fuel Low Threshold for others

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation. 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_AirCntrlShtOffActn: Fuel Low Threshold for SCR

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during SCR 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	150	150	150	150	150	150	150	150

Initial Supporting table - AIC_AirCntrlShtOffActn:Fuel High Threshold for others

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation. 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_BstCntrlCL: Fuel Request On Threshold for C2 and C3

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 and C3 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 D2 and 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	45	40	40	30	25	25	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
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
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
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
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
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
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	3,400
6	0.88	0.68	0.65	0.44	0.68	0.57	1.20	1.28	0.66	0.93	1.35	1.00	0.81	0.72	0.78	0.58	1.53
8	0.64	0.51	0.48	0.32	0.50	0.37	0.72	1.05	0.66	0.70	1.02	1.00	0.81	0.72	0.78	0.58	1.53
12	0.62	0.51	0.44	0.40	0.38	0.28	0.49	0.69	0.57	0.46	0.69	0.70	0.45	0.60	0.64	0.58	1.53
16	0.61	0.50	0.46	0.41	0.38	0.33	0.40	0.51	0.42	0.36	0.50	0.49	0.40	0.53	0.48	0.52	1.53
20	0.57	0.50	0.45	0.46	0.39	0.33	0.29	0.41	0.36	0.36	0.47	0.48	0.42	0.52	0.51	0.45	1.30
30	0.57	0.49	0.45	0.50	0.41	0.38	0.22	0.28	0.38	0.43	0.46	0.48	0.44	0.54	0.60	0.56	0.90
40	0.56	0.50	0.44	0.51	0.40	0.39	0.19	0.20	0.37	0.43	0.43	0.49	0.45	0.56	0.64	0.63	0.67
60	0.56	0.50	0.44	0.53	0.41	0.41	0.15	0.15	0.39	0.45	0.41	0.48	0.47	0.57	0.67	0.73	0.48
98	0.73	0.52	0.44	0.54	0.41	0.42	0.12	0.10	0.39	0.46	0.40	0.48	0.48	0.58	0.71	0.82	0.33

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	3,400
6	1.18	1.34	1.47	1.41	1.84	2.67	2.73	2.41	2.49	3.41	3.35	1.78	2.55	1.46	1.95	1.00	1.42
8	0.98	1.05	1.12	1.05	1.29	1.58	1.91	1.92	2.49	2.33	2.49	1.78	2.55	1.46	1.95	1.00	1.42
12	1.28	1.15	0.99	0.91	0.92	1.09	1.15	1.51	1.61	1.48	1.53	1.47	1.47	1.31	1.70	1.00	1.42
16	1.69	1.28	1.06	0.88	0.83	0.92	0.91	1.22	1.09	1.01	1.05	1.10	1.17	1.00	1.18	0.81	1.42
20	1.74	1.28	1.03	0.87	0.82	0.84	0.86	1.09	1.06	0.96	0.96	1.16	1.12	0.95	1.07	0.70	1.21
30	1.93	1.33	1.02	0.84	0.76	0.76	0.79	1.02	1.08	0.88	0.98	1.44	1.09	0.84	0.90	0.91	1.11
40	2.04	1.36	1.02	0.84	0.73	0.72	0.73	0.92	1.06	0.84	0.93	1.54	1.06	0.79	0.88	0.91	1.18
60	1.70	1.39	1.02	0.83	0.70	0.68	0.70	0.85	1.06	0.81	0.91	1.62	1.01	0.77	0.83	1.03	1.27
98	1.05	1.44	1.01	0.82	0.68	0.65	0.68	0.80	1.06	0.79	0.90	1.70	0.98	0.74	0.81	1.09	1.33

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	1	1	1	1	1	1

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	120	120	120	120	120	120

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	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
10	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
20	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
30	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
40	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
50	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
60	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
70	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
80	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
90	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
100	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0

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	330
1	1	1	1	1	1	1

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	120	120	120	120	120	120

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	3,400
4	1.86	1.64	1.74	1.44	1.57	1.31	0.84	0.80	1.18	2.03	1.94	1.06	1.29	0.84	1.00	0.96	1.18
6	1.06	1.05	1.08	0.95	0.96	0.92	0.84	0.80	1.18	1.98	1.89	1.06	1.29	0.84	1.00	0.96	1.18
10	1.12	1.12	1.16	1.21	1.21	1.12	0.70	0.82	1.13	1.17	1.15	1.05	1.00	0.84	1.00	0.96	1.18
14	1.05	1.17	1.21	1.32	1.28	1.23	1.03	1.09	1.04	1.24	1.12	1.07	1.02	1.05	1.13	0.90	1.14
18	1.07	1.15	1.21	1.35	1.32	1.30	1.11	1.22	1.16	1.18	1.11	1.00	1.11	1.10	1.16	0.90	1.10
22	1.08	1.20	1.23	1.43	1.36	1.38	1.23	1.24	1.24	1.20	1.12	1.03	1.09	1.15	1.23	1.00	1.00
30	1.07	1.21	1.25	1.48	1.40	1.47	1.33	1.37	1.32	1.22	1.09	1.02	1.08	1.26	1.29	1.12	0.92
60	1.07	1.23	1.26	1.54	1.44	1.54	1.45	1.45	1.42	1.22	1.09	1.05	1.07	1.34	1.37	1.25	0.79
98	1.00	1.23	1.27	1.57	1.46	1.57	1.49	1.48	1.47	1.23	1.09	1.04	1.10	1.38	1.39	1.31	0.73

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	3,400
4	0	0	-1	-1	0	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
6	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
10	0	0	0	0	0	0	-1	-1	0	0	-1	-1	-1	-1	-1	-1	-1
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - ConsecSCD_Decel

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
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
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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 - 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
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	904	585	399	233	164	110	54	54	45	38	47	20	16
2	904	585	399	233	164	110	54	54	45	38	47	20	16
4	904	585	399	233	164	110	54	54	45	38	47	20	16
6	1,436	927	608	373	248	179	74	54	45	38	47	20	16
8	1,977	1,266	811	505	340	231	115	87	75	46	47	27	21
10	2,410	1,687	1,064	654	414	292	143	113	99	57	47	34	26
12	3,059	1,948	1,245	775	500	354	181	136	111	71	54	40	31
14	3,531	2,263	1,453	914	590	421	202	159	131	87	62	44	37
16	4,063	2,688	1,673	1,066	679	485	230	195	156	96	72	52	41
18	4,600	3,024	1,885	1,196	758	542	264	225	184	112	81	60	48
20	5,150	3,359	2,098	1,334	844	608	303	261	207	123	86	68	53
22	5,690	3,706	2,310	1,471	929	668	323	297	229	144	97	72	57
24	6,210	4,052	2,522	1,609	1,014	730	356	332	261	158	103	77	61
30	7,770	5,093	3,159	2,022	1,269	916	446	419	318	190	128	95	76
40	10,370	6,826	4,221	2,710	1,695	1,225	597	567	445	269	175	131	105
60	15,570	10,294	6,344	4,086	2,545	1,845	899	877	673	404	257	194	155
97	20,000	16,795	10,324	6,666	4,139	3,006	1,465	1,453	1,109	664	416	314	252

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	16	11	13	9	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
2	16	11	13	9	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
4	16	11	13	9	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
6	16	11	13	9	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
8	16	11	13	9	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
10	20	14	13	9	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
12	23	18	15	11	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
14	27	21	16	13	12	10	9	32,768	32,768	32,768	32,768	32,768	32,768
16	33	23	18	15	14	10	9	32,768	32,768	32,768	32,768	32,768	32,768
18	35	27	21	16	15	12	9	32,768	32,768	32,768	32,768	32,768	32,768
20	41	32	24	19	16	13	10	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeDecel

22	45	35	26	20	17	14	12	32,768	32,768	32,768	32,768	32,768	32,768
24	48	38	28	21	19	16	12	32,768	32,768	32,768	32,768	32,768	32,768
30	62	51	34	26	21	19	15	32,768	32,768	32,768	32,768	32,768	32,768
40	79	73	47	35	27	24	21	32,768	32,768	32,768	32,768	32,768	32,768
60	120	110	69	52	39	36	31	32,768	32,768	32,768	32,768	32,768	32,768
97	196	183	111	84	60	58	51	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	869	561	387	217	136	106	26	56	45	43	35	19	13
2	869	561	387	217	136	106	26	56	45	43	35	19	13
4	869	561	387	217	136	106	26	56	45	43	35	19	13
6	1,351	889	592	374	255	184	68	56	45	43	35	19	13
8	1,629	1,103	755	490	342	254	115	86	65	54	35	27	18
10	2,212	1,478	979	645	470	309	150	112	89	59	46	35	22
12	2,472	1,698	1,127	819	567	393	190	134	107	69	54	43	29
14	2,857	1,975	1,369	914	673	480	238	167	139	84	62	54	36
16	3,261	2,259	1,542	1,093	795	545	282	214	172	99	80	63	42
18	3,647	2,535	1,735	1,227	896	612	320	246	197	113	92	70	51
20	4,032	2,812	1,928	1,371	1,005	688	365	286	225	127	106	80	58
22	4,418	3,089	2,120	1,515	1,113	761	406	325	257	133	118	87	65
24	4,804	3,365	2,313	1,659	1,222	834	448	358	292	148	131	98	73
30	5,961	4,195	2,891	2,091	1,547	1,052	575	447	375	182	162	126	89
40	7,889	5,579	3,854	2,811	2,088	1,416	786	628	524	251	227	176	126
60	11,745	8,345	5,780	4,251	3,172	2,144	1,208	971	812	376	346	268	196
97	18,976	13,532	9,391	6,951	5,204	3,509	1,999	1,617	1,358	613	572	443	325

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	19	11	13	10	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
2	19	11	13	10	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
4	19	11	13	10	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
6	19	11	13	10	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
8	19	11	13	10	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
10	19	15	13	10	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
12	23	19	15	12	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
14	27	22	17	14	11	11	12	32,768	32,768	32,768	32,768	32,768	32,768
16	30	27	22	17	13	11	12	32,768	32,768	32,768	32,768	32,768	32,768
18	34	30	25	20	15	12	13	32,768	32,768	32,768	32,768	32,768	32,768
20	37	33	30	23	17	12	14	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

22	40	36	34	25	19	14	15	32,768	32,768	32,768	32,768	32,768	32,768
24	43	40	37	29	21	16	15	32,768	32,768	32,768	32,768	32,768	32,768
30	50	49	51	39	27	21	18	32,768	32,768	32,768	32,768	32,768	32,768
40	65	64	70	53	40	30	22	32,768	32,768	32,768	32,768	32,768	32,768
60	96	97	109	82	60	47	30	32,768	32,768	32,768	32,768	32,768	32,768
97	153	157	183	136	100	80	46	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 - 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	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
35	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
45	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
55	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
65	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

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	19.9	20.0	50.0	50.1	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	0.0	0.0	0.0
2,000.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
2,001.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - 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	5,200

EngineOverSpeedLimit - Part 2

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

Initial Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

y/x	850	900	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
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	850	900	1,100	1,200	1,800	2,000	2,800	3,500
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	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	1	1	1	1	1	1	1	1
450	2	2	2	2	2	2	2	2
600	3	3	3	3	3	3	3	3
750	4	4	4	4	4	4	4	4
900	5	5	5	5	5	5	5	5

Initial Supporting table - Flow Resistance High Threshold

Description: Diagnostic threshold for the flow resistance high 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 - Flow Resistance Too High Threshold

Description: Diagnostic threshold for the flow resistance too high 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	4	4	4	4	4	4	4	4

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 - IdleCyl_Decel

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 (%)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
1	1,837	1,160	899	441	305	233	163	121	93	57	38	27	24
2	1,837	1,160	899	441	305	233	163	121	93	57	38	27	24
4	1,837	1,160	899	441	305	233	154	115	88	55	37	26	24
6	1,837	1,160	899	441	305	233	192	144	110	68	45	32	24
8	2,204	1,375	993	627	429	318	244	182	139	87	57	40	29
10	2,571	1,601	1,144	748	507	369	270	201	154	96	64	44	32
12	2,938	1,835	1,327	901	609	436	308	230	176	109	72	51	37
14	3,305	2,051	1,433	1,055	711	505	346	258	198	123	82	57	42
16	3,673	2,268	1,538	1,208	812	572	385	287	220	137	91	63	46
18	4,040	2,485	1,644	1,362	913	640	424	315	241	150	100	70	50
20	4,407	2,703	1,749	1,515	1,015	708	462	345	264	164	109	76	55
22	4,774	2,961	2,061	1,668	1,117	776	500	373	285	177	117	82	59
24	5,509	3,469	2,640	1,975	1,319	912	577	430	329	205	136	95	68
30	7,345	4,758	4,180	2,743	1,827	1,251	770	574	439	273	181	126	92
40	7,838	5,654	5,170	4,277	2,842	1,930	1,154	860	658	409	271	189	137
60	8,663	6,479	5,995	5,620	3,730	2,524	1,491	1,111	850	529	351	244	176
97	9,488	7,392	7,260	7,155	4,745	3,203	1,875	1,398	1,069	666	441	307	222

Initial Supporting table - IdleCyl_Jerk

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
1	1,929	1,218	944	463	320	244	171	127	97	60	40	28	25
2	1,929	1,218	944	463	320	244	171	127	97	60	40	28	25
4	1,929	1,218	944	463	320	244	162	121	92	57	39	27	25
6	1,929	1,218	944	463	320	244	202	151	116	72	48	34	25
8	2,314	1,444	1,043	659	450	334	256	191	146	91	60	42	30
10	2,699	1,681	1,201	785	533	387	283	211	161	101	67	46	34
12	3,085	1,926	1,394	946	640	458	324	241	185	115	76	53	39
14	3,471	2,154	1,505	1,107	746	530	364	271	208	129	86	60	44
16	3,856	2,382	1,615	1,269	853	601	404	301	231	144	96	66	48
18	4,242	2,610	1,726	1,430	959	672	445	331	253	158	105	73	53
20	4,627	2,838	1,837	1,590	1,066	744	485	362	277	172	114	80	57
22	5,013	3,109	2,164	1,752	1,173	815	525	392	300	186	123	86	62
24	5,784	3,643	2,772	2,074	1,385	957	606	452	346	215	143	99	72
30	7,712	4,996	4,389	2,880	1,918	1,313	808	602	461	287	190	133	96
40	8,230	5,937	5,429	4,491	2,984	2,027	1,212	903	691	430	285	198	144
60	9,096	6,803	6,295	5,901	3,916	2,650	1,565	1,167	893	555	368	256	185
97	9,962	7,762	7,623	7,512	4,982	3,363	1,969	1,468	1,123	699	463	323	233

Initial Supporting table - IdleSCD_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode. 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 (%)

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 - IdleSCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode. 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 - 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_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 2

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

InfrequentRegen - Part 3

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

Initial Supporting table - 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	175	200	225	250	275	300	325	350	375	400	425	450	475	500	550
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
75	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
100	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
125	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
150	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
175	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
200	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
225	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
250	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
275	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
325	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 - 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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

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

Initial Supporting table -KaFADC_b_FSA_CombModeEnblRls

Description: Enable FSA correction release in a specific combustion mode

KaFADC_b_FSA_CombModeEnblRls - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaFADC_b_FSA_CombModeEnblRls - Part 3

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

KaFADC_b_FSA_CombModeEnblRls - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaFADC_b_FSA_EnblCombMode

Description: Enable FSA learning in a specific combustion mode

KaFADC_b_FSA_EnblCombMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaFADC_b_FSA_EnblCombMode - Part 3

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

KaFADC_b_FSA_EnblCombMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
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	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	

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	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	

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	143	110	102	91	100

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	-143	-110	-102	-91	-100

Initial Supporting table - KaFADD_b_FSA_ECM_EnblCmbMode

Description: Enable P026C and P026D in a specific combustion mode

KaFADD_b_FSA_ECM_EnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADD_b_FSA_ECM_EnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	1	1

KaFADD_b_FSA_ECM_EnblCmbMode - Part 3

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

KaFADD_b_FSA_ECM_EnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADD_b_FSA_ECM_EnblCmbMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

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

Value Units: MPa

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

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	60	70	80	100	120	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	10	20	30	40	50	60	70	80	100	120
450	35	35	35	35	35	35	35	35	35	35
700	35	35	35	35	35	35	35	35	35	35
950	35	35	35	35	35	35	35	35	35	35
1,200	35	35	35	35	35	35	35	35	35	35
1,450	35	35	35	35	35	35	35	35	35	35
1,700	35	35	35	35	35	35	35	35	35	35
1,950	35	35	35	35	35	35	35	35	35	35
2,200	35	35	35	35	35	35	35	35	35	35

Initial Supporting table -KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	10	20	30	40	50	60	70	80	100	120
450	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
700	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
950	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,200	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,450	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,700	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1,950	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
2,200	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35

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	2,500	3,000	3,250
1	0	30	60	70	100	120	110	80	80	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	-100	-70	-51	-50	-20	0	20	50	51	70	100
-100	0	0	0	100	100	100	100	100	0	0	0
-70	0	0	0	100	100	100	100	100	0	0	0
-51	0	0	0	100	100	100	100	100	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
50	0	0	0	100	100	100	100	100	0	0	0
51	0	0	0	100	100	100	100	100	0	0	0
70	0	0	0	100	100	100	100	100	0	0	0
100	0	0	0	100	100	100	100	100	0	0	0

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrsh

Description: Map used to define FSA emission correlated maximum threshold

Value Units: mm^3

y/x	0	1	2	3	4	5	6	7	8	9
0	35	35	35	35	35	35	35	35	35	35
1	35	35	35	35	35	35	35	35	35	35
2	35	35	35	35	35	35	35	35	35	35
3	35	35	35	35	35	35	35	35	35	35
4	35	35	35	35	35	35	35	35	35	35
5	35	35	35	35	35	35	35	35	35	35
6	35	35	35	35	35	35	35	35	35	35
7	35	35	35	35	35	35	35	35	35	35

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrsh

Description: Map used to define FSA emission correlated minimum threshold

Value Units: mm^3

y/x	0	1	2	3	4	5	6	7	8	9
0	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
1	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
2	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
3	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
4	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
5	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
6	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
7	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35

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 - m_NH3_StrgDevErrMaxThrsh

Description: Higher boundary of NH3 Storage Deviation Error [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMinThrsh

Description: Lower boundary of NH3 Storage Deviation Error [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table -m_NH3_StrgMaxThrsh

Description: Higher boundary of estimated NH3 Storage [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	5	5	5	5	5	5	5	5

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 Storage [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_SlipNOxIntglThrsh

Description: NOx integral threshold to enable Slip Condition based on SCR average Temperature [mg] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: mg
X Unit: °C

y/x	250	300	350	425
1	500	500	500	500

Initial Supporting table - Maximum allowed time to complete regeneration

Description:

Value Units: enumerative (mission profiles)
X Unit: seconds
Y Units: N/A

Maximum allowed time to complete regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	3,600,000	7,200	7,200	7,200	7,200	7,200	7,200

Maximum allowed time to complete regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	7,200	7,200	7,200	7,200	7,200	7,200	7,200

Maximum allowed time to complete regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	7,200	7,200	7,200	7,200	7,200		

Initial Supporting table - Maximum allowed time to reach steady state for regeneration

Description:

Value Units: seconds
X Unit: enumerative (mission profiles)
Y Units: N/A

Maximum allowed time to reach steady state for regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	3,600,000	2,300	2,300	2,300	2,300	2,300	2,300

Maximum allowed time to reach steady state for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Maximum allowed time to reach steady state for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	2,300	2,300	2,300	2,300	2,300		

Initial Supporting table - Maximum allowed time to release post injections for regeneration

Description:

Value Units: enumerative (mission profiles)
X Unit: seconds
Y Units: N/A

Maximum allowed time to release post injections for regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	36,000,000	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to release post injections for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to release post injections for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	3,600	3,600	3,600	3,600	3,600		

Initial Supporting table - 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 - 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	420	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	13	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 - 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 - P0181 Fuel Temperature Plausibility

Description: Minimum temperature deviation (°C) as function of engine off time (s) in order to consider not plausible fuel temperature sensor.

Value Units: °C
X Unit: s

y/x	5	7	9	11	13	15	17	19
1	20	20	20	20	20	20	20	20

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_IAT_2_Snsr

Initial Supporting table - P0191 Rail Pressure Sensor Configuration

Description:

Value Units: -

y/x	1
1	CeFHPG_e_RPS_DoubleTrack

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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

P0234, P0299: Boost pressure control deviation enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
1	1	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	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
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	320	320	320	320

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	90	100	110	120

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	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
600	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
1,000	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
1,200	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
1,400	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
1,600	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
1,800	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
2,000	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
2,200	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
2,600	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48
3,000	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-36	-48	-48	-48

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	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
600	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
1,000	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
1,200	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
1,400	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
1,600	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
1,800	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
2,000	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
2,200	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
2,600	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40
3,000	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-40	-40

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

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	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
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	320	320	320	320

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	82	90	98	106

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	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
600	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
1,000	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
1,200	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
1,400	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
1,600	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
1,800	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
2,000	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
2,200	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
2,600	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72
3,000	24	24	24	24	24	24	24	24	24	24	24	48	72	72	72

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	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
600	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
1,000	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
1,200	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
1,400	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
1,600	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
1,800	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
2,000	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
2,200	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
2,600	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60
3,000	20	20	20	20	20	20	20	20	20	20	20	40	60	60	60

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

P0401, P0402: EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

P0401, P0402: EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
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	-7	0	5	10	15	20	25	30	35	40
1	0	0	0	0	0	0	0	0	0	0

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	-7	0	5	10	15	20	25	30	35	40
1	0	0	0	0	0	0	0	0	0	0

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	-7	0	5	10	15	20	25	30	35	40
1	0	0	0	0	0	0	0	0	0	0

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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000
0	-400	-400	-400	-400	-400	-400	-400	-400
5	-400	-400	-400	-400	-400	-400	-400	-400
10	-400	-400	-400	-400	-400	-400	-400	-400
15	-400	-400	-400	-400	-400	-400	-400	-400
20	-400	-400	-400	-400	-400	-400	-400	-400
25	-400	-400	-400	-400	-400	-400	-400	-400
30	-400	-400	-400	-400	-400	-400	-400	-400
35	-400	-400	-400	-400	-400	-400	-400	-400
40	-400	-400	-400	-400	-400	-400	-400	-400

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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
0	-400	-400	-400	-400	-400	-400	-400	-400
5	-400	-400	-400	-400	-400	-400	-400	-400
10	-400	-400	-400	-400	-400	-400	-400	-400
15	-400	-400	-400	-400	-400	-400	-400	-400
20	-400	-400	-400	-400	-400	-400	-400	-400
25	-400	-400	-400	-400	-400	-400	-400	-400
30	-400	-400	-400	-400	-400	-400	-400	-400
35	-400	-400	-400	-400	-400	-400	-400	-400
40	-400	-400	-400	-400	-400	-400	-400	-400

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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
0	-400	-400	-400	-400	-400	-400	-400	-400
5	-400	-400	-400	-400	-400	-400	-400	-400
10	-400	-400	-400	-400	-400	-400	-400	-400
15	-400	-400	-400	-400	-400	-400	-400	-400
20	-400	-400	-400	-400	-400	-400	-400	-400
25	-400	-400	-400	-400	-400	-400	-400	-400
30	-400	-400	-400	-400	-400	-400	-400	-400
35	-400	-400	-400	-400	-400	-400	-400	-400
40	-400	-400	-400	-400	-400	-400	-400	-400

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 barometric pressure.

Value Units: mg
X Unit: kPa

y/x	65	70	83	96
1	52	52	52	52

Initial Supporting table - P0402: Excessive EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII excessive EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-7	0	5	10	15	20	25	30	35	40
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0402: Excessive EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII excessive EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-7	0	5	10	15	20	25	30	35	40
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0402: Excessive EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII excessive EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-7	0	5	10	15	20	25	30	35	40
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0402: Excessive EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for excessive 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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
40	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0

Initial Supporting table - P0402: Excessive EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for excessive 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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
40	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0

Initial Supporting table - P0402: Excessive EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for excessive 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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
40	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0

Initial Supporting table - P0402: Excessive EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for excessive 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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
40	120	120	120	120	120	120	120	120
60	120	120	120	120	120	120	120	120
80	120	120	120	120	120	120	120	120
90	120	120	120	120	120	120	120	120
100	120	120	120	120	120	120	120	120
110	120	120	120	120	120	120	120	120
120	120	120	120	120	120	120	120	120
130	120	120	120	120	120	120	120	120
140	120	120	120	120	120	120	120	120

Initial Supporting table - P0402: Excessive EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for excessive 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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
40	120	120	120	120	120	120	120	120
60	120	120	120	120	120	120	120	120
80	120	120	120	120	120	120	120	120
90	120	120	120	120	120	120	120	120
100	120	120	120	120	120	120	120	120
110	120	120	120	120	120	120	120	120
120	120	120	120	120	120	120	120	120
130	120	120	120	120	120	120	120	120
140	120	120	120	120	120	120	120	120

Initial Supporting table - P0402: Excessive EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for excessive 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	600	800	1,000	1,200	1,400	1,600	1,800	2,000
40	120	120	120	120	120	120	120	120
60	120	120	120	120	120	120	120	120
80	120	120	120	120	120	120	120	120
90	120	120	120	120	120	120	120	120
100	120	120	120	120	120	120	120	120
110	120	120	120	120	120	120	120	120
120	120	120	120	120	120	120	120	120
130	120	120	120	120	120	120	120	120
140	120	120	120	120	120	120	120	120

Initial Supporting table - P0402: Maximum desired EGR flow

Description: Maximum desired EGR flow below which the excessive EGR flow is enabled. It is function of barometric pressure.

Value Units: mg
X Unit: kPa

y/x	65	70	83	96
1	160	200	300	400

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_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	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	0	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	1	1	0	0
CePISR_e_EventA_Seq	1	0	0	0
CePISR_e_EventB_Seq	1	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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

Description: Fail threshold for PSW per operating loop.

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

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	5	

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

Description: Sample threshold for PSW per operating loop.

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

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P1037 Cold Start Fuel Injection Performance - COMB MODE

Description: Calibration map for the enabling of CSERS fuel injection system monitoring, function of combustion mode.

P1037 Cold Start Fuel Injection Performance - COMB MODE - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1.0000000000000000000000	0	0	0	0	0	0

P1037 Cold Start Fuel Injection Performance - COMB MODE - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1.0000000000000000000000	0	0	1	0	0	0

P1037 Cold Start Fuel Injection Performance - COMB MODE - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1.0000000000000000000000	0	0	0	0	0	0

P1037 Cold Start Fuel Injection Performance - COMB MODE - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
1.0000000000000000000000	0	0	0	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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

P140B, P140C: EGR slow response enabling - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx		
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	100	100	100

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	100	100	100

Initial Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - P16F3_CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	1,453	876	695	559	474	414	370	335	309	287	269	254	240	227	217	208	199

Initial Supporting table - P16F3_DPF Max Regeneration Time f(RPM)

Description: Time treshold over which Safety diagnostic will check if an outward Combustion Mode transition from a DPF_Regen Mode is correctly ended.

y/x	700	1,000	1,300
1	3,600	3,600	3,600

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

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	1,453	876	695	559	474	414	370	335	309	287	269	254	240	227	217	208	199

Initial Supporting table - P16F3_FTD safety deadband threshold f(Fuel Rail Pressure)

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

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	1,453	876	695	559	474	414	370	335	309	287	269	254	240	227	217	208	199

Initial Supporting table - P16F3_Rail Pressure Wave Compensation f(Fuel Rail Pressure, Fuel Quantity)

Description: Safety treshold for the Rail Pressure Wave Compensation on each torque forming pulse as a function of Fuel Rail Pressure and Fuel Quantity

y/x	0	1	2	3	5	7	10	15	25	35	40	50
20	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
60	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
100	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
140	1	1	1	1	1	1	1	1	1	1	1	1
160	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1
200	1	1	1	1	1	1	1	1	1	1	1	1

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	4,096	4,096	4,096	4,096	4,096	4,096
550	170	170	170	170	170	170
600	170	170	170	170	170	170
650	170	170	170	170	170	170
700	170	170	170	170	170	170
750	170	170	170	170	170	170
800	170	170	170	170	170	170
850	193	193	193	193	193	193
900	215	215	215	215	215	215
1,000	238	238	238	238	238	238
1,100	260	260	260	260	260	260
1,200	280	280	280	280	280	280
1,400	300	300	300	300	300	300
1,600	340	340	340	340	340	340
1,800	365	365	365	365	365	365
4,000	390	390	390	390	390	390
5,000	-30	-30	-30	-30	-30	-30

Initial Supporting table - P16F3_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	18	35	51	68	84	101	117	134	150	167	183	200
1	1,347	864	648	543	466	405	362	335	309	288	263	246

Initial Supporting table - P16F3_TSC safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on Energizing Time compensation for Temperature Specific Current (TSC) (for each torque forming pulse) as function of Fuel Rail Pressure

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	1,453	876	695	559	474	414	370	335	309	287	269	254	240	227	217	208	199

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

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	25	38	50	63	75	88	100	113	125	138	150	163	175	188	200	213	225
1	336	241	188	157	135	120	109	100	93	87	82	77	73	70	66	64	63

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

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	25	38	50	63	75	88	100	113	125	138	150	163	175	188	200	213	225
1	-336	-241	-188	-157	-135	-120	-109	-100	-93	-87	-82	-77	-73	-70	-66	-64	-63

Initial Supporting table - P2263: Boost pressure system performance monitor delay timer

Description: Delay timer before enabling the boost pressure system performance monitor once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

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

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control active)

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

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

y/x	68	90	120	150	180	210	240	270
800	-50	-50	-50	-50	-50	-50	-60	-70
1,200	-50	-50	-50	-50	-50	-50	-60	-70
1,600	-50	-50	-50	-50	-50	-50	-60	-70
2,000	-50	-50	-50	-50	-50	-50	-60	-70
2,400	-50	-50	-50	-50	-50	-50	-60	-70
2,800	-50	-50	-50	-50	-50	-50	-60	-70
3,200	-50	-50	-50	-50	-50	-50	-60	-70

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control not active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

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

y/x	68	90	120	150	180	210	240	270
800	-40	-40	-40	-40	-40	-40	-50	-60
1,200	-40	-40	-40	-40	-40	-40	-50	-60
1,600	-40	-40	-40	-40	-40	-40	-50	-60
2,000	-40	-40	-40	-40	-40	-40	-50	-60
2,400	-40	-40	-40	-40	-40	-40	-50	-60
2,800	-40	-40	-40	-40	-40	-40	-50	-60
3,200	-40	-40	-40	-40	-40	-40	-50	-60

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

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

y/x	68	90	120	150	180	210	240	270
800	50	50	50	50	60	70	80	80
1,200	50	50	50	50	60	70	80	80
1,600	50	50	50	50	60	70	80	80
2,000	50	50	50	50	60	70	80	80
2,400	50	50	50	50	60	70	80	80
2,800	50	50	50	50	60	70	80	80
3,200	50	50	50	50	60	70	80	80

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control not active)

Description: Boost pressure deviation threshold for boost pressure system performance monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

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

y/x	68	90	120	150	180	210	240	270
800	40	40	40	40	60	70	80	80
1,200	40	40	40	40	60	70	80	80
1,600	40	40	40	40	60	70	80	80
2,000	40	40	40	40	60	70	80	80
2,400	40	40	40	40	60	70	80	80
2,800	40	40	40	40	60	70	80	80
3,200	40	40	40	40	60	70	80	80

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 P228D Air ambient pressure calibrated as enabling condition (MU)

Description: 0 = air ambient pressure is not considered as enabling condition, 1 = air ambient pressure is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P228C P228D Air ambient temperature calibrated as enabling condition (MU)

Description: 0 = air ambient temperature is not considered as enabling condition, 1 = air ambient temperature is considered as enabling condition

y/x	1
1	1

Initial Supporting table - P228C P228D Low fuel level calibrated as enabling condition (MU)

Description: 0 = low fuel level is not considered as enabling condition, 1 = low fuel level is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P228C Positive rail pressure deviation (MU)

Description: Positive rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	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	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	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16

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 P229B Air ambient pressure calibrated as enabling condition (PR)

Description: 0 = air ambient pressure is not considered as enabling condition, 1 = air ambient pressure is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A P229B Air ambient temperature calibrated as enabling condition (PR)

Description: 0 = air ambient temperature is not considered as enabling condition, 1 = air ambient temperature is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A P229B Low fuel level calibrated as enabling condition (PR)

Description: 0 = low fuel level is not considered as enabling condition, 1 = low fuel level is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A Positive rail pressure deviation (PR)

Description: Positive rail pressure deviation threshold (MPa) when pressure regulator is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16

Initial Supporting table - P2635 Max Fuel Flow

Description: P2635 Maximum Fuel Flow Disable Criteria
Maximum allowed fuel flow values above which the diagnostic is disabled

Value Units: grams / second
X Unit: kilopascals [commanded fuel pressure]
Y Units: volts [device supply]

y/x	200	250	300	350	400	450	500	550	600
5	512	512	512	512	512	512	512	512	512
6	512	512	512	512	512	512	512	512	512
8	512	512	512	512	512	512	512	512	512
9	512	512	512	512	512	512	512	512	512
11	512	512	512	512	512	512	512	512	512
12	512	512	512	512	512	512	512	512	512
14	512	512	512	512	512	512	512	512	512
15	512	512	512	512	512	512	512	512	512
17	512	512	512	512	512	512	512	512	512
18	512	512	512	512	512	512	512	512	512
20	512	512	512	512	512	512	512	512	512
21	512	512	512	512	512	512	512	512	512
23	512	512	512	512	512	512	512	512	512
24	512	512	512	512	512	512	512	512	512
26	512	512	512	512	512	512	512	512	512
27	512	512	512	512	512	512	512	512	512
29	512	512	512	512	512	512	512	512	512

Initial Supporting table - P2635 Threshold High

Description: P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals
X Unit: kilopascals [commanded fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	40	40	40	40	40	40	40	40	40
2	40	40	40	40	40	40	40	40	40
3	40	40	40	40	40	40	40	40	40
5	40	40	40	40	40	40	40	40	40
6	40	40	40	40	40	40	40	40	40
8	40	40	40	40	40	40	40	40	40
9	40	40	40	40	40	40	40	40	40
11	40	40	40	40	40	40	40	40	40
12	40	40	40	40	40	40	40	40	40
14	40	40	40	40	40	40	40	40	40
15	40	40	40	40	40	40	40	40	40
17	40	40	40	40	40	40	40	40	40
18	40	40	40	40	40	40	40	40	40
20	40	40	40	40	40	40	40	40	40
21	40	40	40	40	40	40	40	40	40
23	40	40	40	40	40	40	40	40	40
24	40	40	40	40	40	40	40	40	40
26	40	40	40	40	40	40	40	40	40
27	40	40	40	40	40	40	40	40	40
29	40	40	40	40	40	40	40	40	40
30	40	40	40	40	40	40	40	40	40
32	40	40	40	40	40	40	40	40	40
33	40	40	40	40	40	40	40	40	40
35	40	40	40	40	40	40	40	40	40
36	40	40	40	40	40	40	40	40	40
38	40	40	40	40	40	40	40	40	40
39	40	40	40	40	40	40	40	40	40
41	40	40	40	40	40	40	40	40	40
42	40	40	40	40	40	40	40	40	40
44	40	40	40	40	40	40	40	40	40
45	40	40	40	40	40	40	40	40	40

Initial Supporting table - P2635 Threshold High

47	40	40	40	40	40	40	40	40	40
48	40	40	40	40	40	40	40	40	40

Initial Supporting table - P2635 Threshold Low

Description: P2635 Filtered Pressure Error Low Threshold [over-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals
X Unit: kilopascals [commanded fuel pressure]
Y Units: grams / second [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	-40	-40	-40	-40	-40	-40	-40	-40	-40
2	-40	-40	-40	-40	-40	-40	-40	-40	-40
3	-40	-40	-40	-40	-40	-40	-40	-40	-40
5	-40	-40	-40	-40	-40	-40	-40	-40	-40
6	-40	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40	-40
9	-40	-40	-40	-40	-40	-40	-40	-40	-40
11	-40	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40	-40
14	-40	-40	-40	-40	-40	-40	-40	-40	-40
15	-40	-40	-40	-40	-40	-40	-40	-40	-40
17	-40	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40	-40
20	-40	-40	-40	-40	-40	-40	-40	-40	-40
21	-40	-40	-40	-40	-40	-40	-40	-40	-40
23	-40	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40	-40
26	-40	-40	-40	-40	-40	-40	-40	-40	-40
27	-40	-40	-40	-40	-40	-40	-40	-40	-40
29	-40	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40	-40
32	-40	-40	-40	-40	-40	-40	-40	-40	-40
33	-40	-40	-40	-40	-40	-40	-40	-40	-40
35	-40	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40	-40
38	-40	-40	-40	-40	-40	-40	-40	-40	-40
39	-40	-40	-40	-40	-40	-40	-40	-40	-40
41	-40	-40	-40	-40	-40	-40	-40	-40	-40
42	-40	-40	-40	-40	-40	-40	-40	-40	-40
44	-40	-40	-40	-40	-40	-40	-40	-40	-40
45	-40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P2635 Threshold Low

47	-40	-40	-40	-40	-40	-40	-40	-40	-40
48	-40	-40	-40	-40	-40	-40	-40	-40	-40

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
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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 - 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
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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 -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	3,400
4	1.15	1.12	1.46	1.45	1.31	0.99	0.89	1.03	0.85	1.20	1.03	0.75	0.76	0.60	0.72	0.88	1.35
6	0.71	0.73	0.91	0.96	0.80	0.73	0.89	1.03	0.85	1.20	1.03	0.75	0.76	0.60	0.72	0.88	1.35
10	0.77	0.76	0.87	0.95	0.90	0.83	0.80	0.78	0.81	0.67	0.62	0.60	0.74	0.60	0.72	0.88	1.35
14	0.78	0.86	0.87	0.93	0.96	0.90	0.86	0.86	0.72	0.74	0.66	0.67	0.86	1.03	1.08	0.88	1.35
18	0.77	0.85	0.85	0.97	0.96	0.90	0.85	0.87	0.81	0.74	0.72	0.68	0.89	1.10	1.14	1.00	1.22
22	0.78	0.86	0.86	0.96	0.98	0.92	0.92	0.85	0.88	0.74	0.74	0.70	0.96	1.40	1.26	1.09	1.04
30	0.79	0.88	0.85	0.96	0.99	0.98	0.98	0.92	0.87	0.79	0.80	0.73	0.91	1.51	1.50	1.34	0.94
60	0.80	0.90	0.84	0.96	1.01	1.02	1.01	0.97	0.93	0.80	0.81	0.79	0.93	1.77	1.63	1.55	0.79
98	0.98	0.90	0.84	0.96	1.01	1.04	1.07	0.99	0.95	0.81	0.84	0.81	0.94	1.87	1.71	1.67	0.73

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	3,400
4	1.34	1.38	1.75	2.01	1.61	2.94	1.00	1.34	1.40	1.81	1.73	1.08	1.27	1.00	1.00	1.09	1.38
6	0.86	0.90	1.02	1.07	0.92	1.13	1.00	1.13	1.40	1.81	1.73	1.08	1.27	1.00	1.00	1.09	1.38
10	0.90	0.97	0.98	1.01	1.06	1.02	1.07	1.06	0.90	0.90	1.03	1.05	0.83	1.00	1.00	1.09	1.38
14	1.01	1.02	1.00	1.01	1.03	0.99	0.98	1.27	1.00	0.86	0.81	0.89	0.75	0.92	0.95	1.09	1.38
18	1.02	1.04	0.97	1.00	1.10	0.92	1.13	1.13	0.93	0.92	0.75	0.71	0.77	0.92	0.95	1.13	1.27
22	1.04	1.05	0.98	0.99	1.08	0.97	1.24	1.25	0.93	0.79	0.68	0.72	0.81	1.13	1.06	1.14	1.21
30	1.06	1.06	0.98	0.98	1.11	0.95	1.26	1.45	0.87	0.76	0.65	0.79	0.81	1.17	1.18	1.31	1.05
60	1.08	1.07	0.97	0.97	1.12	0.94	1.32	1.50	0.87	0.76	0.60	0.78	0.86	1.33	1.32	1.31	0.88
98	1.05	1.10	0.97	0.96	1.13	0.94	1.34	1.53	0.86	0.75	0.58	0.78	0.87	1.36	1.38	1.40	0.79

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 - 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
4	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
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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
4	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
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	3,400
4	1.08	1.20	1.11	1.02	1.27	1.00	1.21	1.51	1.04	1.15	1.00	1.00	1.38	1.24	1.50	1.25	1.12
8	1.00	1.08	1.15	1.20	1.27	1.00	1.11	1.46	1.04	1.15	1.00	1.00	1.38	1.20	1.50	1.25	1.12
12	1.00	1.07	1.16	1.32	1.28	1.05	1.10	1.40	1.27	1.31	1.26	1.24	1.32	1.30	1.45	1.23	1.08
18	1.01	1.07	1.19	1.27	1.28	1.15	1.06	1.39	1.37	1.38	1.26	1.21	1.28	1.43	1.56	1.32	1.20
22	1.00	1.06	1.21	1.28	1.28	1.18	1.09	1.34	1.42	1.38	1.37	1.26	1.32	1.52	1.60	1.38	1.22
24	1.00	1.06	1.21	1.28	1.29	1.18	1.06	1.31	1.46	1.50	1.41	1.34	1.40	1.53	1.62	1.37	1.24
30	1.00	1.05	1.22	1.29	1.29	1.18	1.04	1.23	1.38	1.53	1.59	1.35	1.29	1.61	1.62	1.60	1.32
60	1.00	1.04	1.22	1.31	1.29	1.20	1.04	1.20	1.40	1.59	1.65	1.48	1.23	1.65	1.65	1.79	1.45
98	1.00	1.03	1.23	1.32	1.29	1.15	1.00	1.20	1.44	1.62	1.70	1.51	1.27	1.73	1.68	1.92	1.49

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	3,400
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	1.05	1.14	1.00
8	1.01	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.14	1.00
12	1.06	1.02	1.00	1.00	1.00	1.00	1.00	1.02	1.02	1.00	1.00	1.00	1.00	1.00	1.09	1.14	1.00
18	1.13	1.02	1.00	1.00	1.00	1.00	1.00	1.13	1.00	1.01	1.00	1.01	1.00	1.01	1.13	1.07	1.00
22	1.14	1.04	1.00	1.00	1.00	1.00	1.00	1.20	1.00	1.00	1.01	1.27	1.18	1.06	1.14	1.14	1.00
24	1.14	1.04	1.00	1.00	1.00	1.00	1.00	1.25	1.00	1.00	1.03	1.27	1.18	1.05	1.11	1.12	1.07
30	1.15	1.04	1.00	1.00	1.00	1.00	1.00	1.29	1.00	1.00	1.11	1.41	1.26	1.00	1.01	1.11	1.08
60	1.18	1.04	1.00	1.00	1.00	1.00	1.00	1.30	1.00	1.00	1.11	1.59	1.33	1.00	1.00	1.06	1.15
98	1.05	1.04	1.00	1.00	1.00	1.00	1.00	1.35	1.00	1.00	1.12	1.68	1.36	1.00	1.00	1.12	1.15

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
4	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
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	550	900	1,200	1,600	2,000	2,400	2,800	3,400	5,000
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table -RevMode_Decel

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

Value Units: Delta time between revolutions (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	550	900	1,200	1,600	2,000	2,400	2,800	3,400	5,000
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	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
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table -t_DerTempDsblTmr

Description: Disabling timer based on the time derivative of SCR average temperature [sec] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: sec
X Unit: °C/sec

y/x	-10	-5	0	2	5	9	10	12
1	10	10	10	10	10	10	90	180

Initial Supporting table - T_MaxTempGrad

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

Value Units: °C
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	35	35	35	35	35	35	35	35

Initial Supporting table - T_MinTempGrad

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

Value Units: °C
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	-35	-35	-35	-35	-35	-35	-35	-35

Initial Supporting table - t_NOxFlowIncDsblTmr

Description: Debounce time to wait after the NOx flow enter 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	1.10	0.80	0.50	0.70	0.70	0.80	0.90	1.60	1.70	0.50	0.80	0.30	1.23
75	1.10	0.80	0.50	0.70	0.70	0.80	0.90	1.60	1.70	0.50	0.80	0.30	1.23
85	1.10	0.80	0.50	0.70	0.70	0.80	0.90	1.60	1.70	0.50	0.80	0.30	1.23
95	1.10	0.80	0.50	0.70	0.70	0.80	0.90	1.60	1.70	0.50	0.80	0.30	1.23
105	1.10	0.80	0.50	0.70	0.70	0.80	0.90	1.60	1.70	0.50	0.80	0.30	1.23

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	2.16	3.09	4.02	4.95	5.88	6.81	7.74	8.67	9.60	10.53	11.46	13.32	15.18
75	2.16	3.09	4.02	4.95	5.88	6.81	7.74	8.67	9.60	10.53	11.46	13.32	15.18
85	2.16	3.09	4.02	4.95	5.88	6.81	7.74	8.67	9.60	10.53	11.46	13.32	15.18
95	2.16	3.09	4.02	4.95	5.88	6.81	7.74	8.67	9.60	10.53	11.46	13.32	15.18
105	2.16	3.09	4.02	4.95	5.88	6.81	7.74	8.67	9.60	10.53	11.46	13.32	15.18

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

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

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

y/x	0.0	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0

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

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

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

y/x	0.0	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
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 - P054E_IFM_MinFuelIdleC1_G

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

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	40.41	40.41	40.41	40.41	40.41
-10.04	26.20	26.20	26.20	26.20	26.20
-0.04	25.59	25.59	25.59	25.59	25.59
19.96	18.41	18.41	18.41	18.41	18.41
39.96	12.41	12.41	12.41	12.41	12.41
69.96	10.80	10.80	10.80	10.80	10.80

Initial Supporting table - P054E_IFM_MinFuelIdleC1_PN

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

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	26.59	26.59	26.59	26.59	26.59
-10.04	17.00	17.00	17.00	17.00	17.00
-0.04	11.20	11.20	11.20	11.20	11.20
19.96	9.00	9.00	9.00	9.00	9.00
39.96	9.41	9.41	9.41	9.41	9.41
69.96	8.20	8.20	8.20	8.20	8.20

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	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	40.41	40.41	40.41	40.41	40.41
-10.04	26.20	26.20	26.20	26.20	26.20
-0.04	25.59	25.59	25.59	25.59	25.59
19.96	18.41	18.41	18.41	18.41	18.41
39.96	12.41	12.41	12.41	12.41	12.41
69.96	10.80	10.80	10.80	10.80	10.80

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	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	26.59	26.59	26.59	26.59	26.59
-10.04	17.00	17.00	17.00	17.00	17.00
-0.04	11.20	11.20	11.20	11.20	11.20
19.96	9.00	9.00	9.00	9.00	9.00
39.96	9.41	9.41	9.41	9.41	9.41
69.96	8.20	8.20	8.20	8.20	8.20

Initial Supporting table - P054E_IFM_MinFuelIdleT1_G

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	40.41	40.41	40.41	40.41	40.41
-10.04	26.20	26.20	26.20	26.20	26.20
-0.04	25.59	25.59	25.59	25.59	25.59
19.96	18.41	18.41	18.41	18.41	18.41
39.96	12.41	12.41	12.41	12.41	12.41
69.96	10.80	10.80	10.80	10.80	10.80

Initial Supporting table - P054E_IFM_MinFuelIdleT1_PN

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	26.59	26.59	26.59	26.59	26.59
-10.04	17.00	17.00	17.00	17.00	17.00
-0.04	11.20	11.20	11.20	11.20	11.20
19.96	9.00	9.00	9.00	9.00	9.00
39.96	9.41	9.41	9.41	9.41	9.41
69.96	8.20	8.20	8.20	8.20	8.20

Initial Supporting table - P054E_IFM_MinFuelIdleT2_G

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	40.41	40.41	40.41	40.41	40.41
-10.04	26.20	26.20	26.20	26.20	26.20
-0.04	25.59	25.59	25.59	25.59	25.59
19.96	18.41	18.41	18.41	18.41	18.41
39.96	12.41	12.41	12.41	12.41	12.41
69.96	10.80	10.80	10.80	10.80	10.80

Initial Supporting table - P054E_IFM_MinFuelIdleT2_PN

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	26.59	26.59	26.59	26.59	26.59
-10.04	17.00	17.00	17.00	17.00	17.00
-0.04	11.20	11.20	11.20	11.20	11.20
19.96	9.00	9.00	9.00	9.00	9.00
39.96	9.41	9.41	9.41	9.41	9.41
69.96	8.20	8.20	8.20	8.20	8.20

Initial Supporting table - P054E_IFM_MinFuelIdleT3_G

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	40.41	40.41	40.41	40.41	40.41
-10.04	26.20	26.20	26.20	26.20	26.20
-0.04	25.59	25.59	25.59	25.59	25.59
19.96	18.41	18.41	18.41	18.41	18.41
39.96	12.41	12.41	12.41	12.41	12.41
69.96	10.80	10.80	10.80	10.80	10.80

Initial Supporting table - P054E_IFM_MinFuelIdleT3_PN

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	26.59	26.59	26.59	26.59	26.59
-10.04	17.00	17.00	17.00	17.00	17.00
-0.04	11.20	11.20	11.20	11.20	11.20
19.96	9.00	9.00	9.00	9.00	9.00
39.96	9.41	9.41	9.41	9.41	9.41
69.96	8.20	8.20	8.20	8.20	8.20

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Fuel Idle 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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

P054F_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

P054F_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	1	0	1

P054F_IFM_CombModesEnbl - Part 4

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

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_G

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

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	55.53	55.53	55.53	55.53	55.53
-10.04	41.20	41.20	41.20	41.20	41.20
-0.04	40.66	40.66	40.66	40.66	40.66
19.96	33.53	33.53	33.53	33.53	33.53
39.96	27.47	27.47	27.47	27.47	27.47
69.96	26.00	26.00	26.00	26.00	26.00

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_PN

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

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	39.00	39.00	39.00	39.00	39.00
-10.04	29.34	29.34	29.34	29.34	29.34
-0.04	23.53	23.53	23.53	23.53	23.53
19.96	21.27	21.27	21.27	21.27	21.27
39.96	21.87	21.87	21.87	21.87	21.87
69.96	20.60	20.60	20.60	20.60	20.60

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	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	55.53	55.53	55.53	55.53	55.53
-10.04	41.20	41.20	41.20	41.20	41.20
-0.04	40.66	40.66	40.66	40.66	40.66
19.96	33.53	33.53	33.53	33.53	33.53
39.96	27.47	27.47	27.47	27.47	27.47
69.96	26.00	26.00	26.00	26.00	26.00

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_PN

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

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	39.00	39.00	39.00	39.00	39.00
-10.04	29.34	29.34	29.34	29.34	29.34
-0.04	23.53	23.53	23.53	23.53	23.53
19.96	21.27	21.27	21.27	21.27	21.27
39.96	21.87	21.87	21.87	21.87	21.87
69.96	20.60	20.60	20.60	20.60	20.60

Initial Supporting table -P054F_IFM_MaxFuelIdleT1_G

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	55.53	55.53	55.53	55.53	55.53
-10.04	41.20	41.20	41.20	41.20	41.20
-0.04	40.66	40.66	40.66	40.66	40.66
19.96	33.53	33.53	33.53	33.53	33.53
39.96	27.47	27.47	27.47	27.47	27.47
69.96	26.00	26.00	26.00	26.00	26.00

Initial Supporting table - P054F_IFM_MaxFuelIdleT1_PN

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	39.00	39.00	39.00	39.00	39.00
-10.04	29.34	29.34	29.34	29.34	29.34
-0.04	23.53	23.53	23.53	23.53	23.53
19.96	21.27	21.27	21.27	21.27	21.27
39.96	21.87	21.87	21.87	21.87	21.87
69.96	20.60	20.60	20.60	20.60	20.60

Initial Supporting table -P054F_IFM_MaxFuelIdleT2_G

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	55.53	55.53	55.53	55.53	55.53
-10.04	41.20	41.20	41.20	41.20	41.20
-0.04	40.66	40.66	40.66	40.66	40.66
19.96	33.53	33.53	33.53	33.53	33.53
39.96	27.47	27.47	27.47	27.47	27.47
69.96	26.00	26.00	26.00	26.00	26.00

Initial Supporting table - P054F_IFM_MaxFuelIdleT2_PN

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	39.00	39.00	39.00	39.00	39.00
-10.04	29.34	29.34	29.34	29.34	29.34
-0.04	23.53	23.53	23.53	23.53	23.53
19.96	21.27	21.27	21.27	21.27	21.27
39.96	21.87	21.87	21.87	21.87	21.87
69.96	20.60	20.60	20.60	20.60	20.60

Initial Supporting table -P054F_IFM_MaxFuelIdleT3_G

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	55.53	55.53	55.53	55.53	55.53
-10.04	41.20	41.20	41.20	41.20	41.20
-0.04	40.66	40.66	40.66	40.66	40.66
19.96	33.53	33.53	33.53	33.53	33.53
39.96	27.47	27.47	27.47	27.47	27.47
69.96	26.00	26.00	26.00	26.00	26.00

Initial Supporting table - P054F_IFM_MaxFuelIdleT3_PN

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	0.00	400.00	800.00	1,200.00	1,600.00
-20.04	39.00	39.00	39.00	39.00	39.00
-10.04	29.34	29.34	29.34	29.34	29.34
-0.04	23.53	23.53	23.53	23.53	23.53
19.96	21.27	21.27	21.27	21.27	21.27
39.96	21.87	21.87	21.87	21.87	21.87
69.96	20.60	20.60	20.60	20.60	20.60

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	41,821	36,748	30,116	20,361	12,558	12,558	12,558

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	38,628	3,373	27,339	17,931	10,405	4,384	4,384

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 - 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	23.000	85.000	95.000	105.000	125.000
1.000	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0	1	1	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.100	0.200	0.300	0.400	0.600	0.700	1.000	1.000
1	0	1	1	1	1	1	1	1	1

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_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	1	0	0

KaFADC_b_SQA_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 4

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

Initial Supporting table - KaFADC_n_SQC_HiThrsh

Description: Engine speed high threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_HiThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	2,100	2,100	2,100	2,100
1	2,100	2,100	2,100	2,100
2	2,100	2,100	2,100	2,100
3	2,100	2,100	2,100	2,100
4	2,100	2,100	2,100	2,100

KaFADC_n_SQC_HiThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	2,100	2,100	2,100	2,100
1	2,100	2,100	2,100	2,100
2	2,100	2,100	2,100	2,100
3	2,100	2,100	2,100	2,100
4	2,100	2,100	2,100	2,100

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	2,100	2,100	2,100	
1	2,100	2,100	2,100	
2	2,100	2,100	2,100	
3	2,100	2,100	2,100	
4	2,100	2,100	2,100	

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	1,105	1,105	1,105	1,105
1	1,105	1,105	1,105	1,105
2	1,105	1,105	1,105	1,105
3	1,105	1,105	1,105	1,105
4	1,105	1,105	1,105	1,105

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	1,105	1,105	1,105	1,105
1	1,105	1,105	1,105	1,105
2	1,105	1,105	1,105	1,105
3	1,105	1,105	1,105	1,105
4	1,105	1,105	1,105	1,105

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,105	1,105	1,105	
1	1,105	1,105	1,105	
2	1,105	1,105	1,105	
3	1,105	1,105	1,105	
4	1,105	1,105	1,105	

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	0	13	25	38	50	63	75	88	100
1	10	10	10	10	10	10	10	10	10

Unique Supporting table - Inrush_current_profile

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

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

Unique Supporting table - Inrush_current_profile

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

Unique Supporting table - KaOXYD_b_NOx1_DecrDynChkCmbEnbl

Description: This array indicates what are the combustion mode in which Decreasing Dynamic Check Diagnosis is enabled

KaOXYD_b_NOx1_DecrDynChkCmbEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1_DecrDynChkCmbEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaOXYD_b_NOx1_DecrDynChkCmbEnbl - Part 3

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

KaOXYD_b_NOx1_DecrDynChkCmbEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1_DecrDynChkCmbEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Unique Supporting table - P2598: Positive Position Tracking Error Threshold

Description: Position tracking error above which the VGT vanes positive position control deviation can detect the vanes stuck in a position more closed than its target position. It is function of ambient pressure.

Value Units: %
X Unit: kPa

y/x	60	70	80	90	100	110
1	15	15	15	15	15	15

Unique Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Unique 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	23.000	85.000	95.000	105.000	125.000
1.000	7.000	8.699	9.000	9.199	10.000

Unique Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

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

Unique Supporting table - P0806 EngTorqueThreshold Table

Description: The diagnostic is inhibited if torque (NM) is less than this value. Prevents false fails in regions where false in-gear N/TOS ratios are possible due to low torque, where high torque would otherwise cause slip and prevent a valid in-gear state.

Value Units: Torque (NM)
X Unit: Percent Clutch Pedal Position (%)

y/x	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
1	30.0	30.0	30.0	30.0	40.0	40.0	100.0	100.0	155.0	215.0	270.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P0806 ResidualErrEnableHigh Table

Description: Represents the upper threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The lower threshold of the deadband is represented by the table "P0806 ResidualErrEnableLow Table". A lower threshold value that is greater than or equal to the upper threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P0806 ResidualErrEnableLow Table

Description: Represents the lower threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The upper threshold of the deadband is represented by the table "P0806 ResidualErrEnableHigh Table". An upper threshold value that is less than or equal to the lower threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Unique Supporting table - CatCrtdEffRepEWMA

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

y/x	250	266	282	298	314	330
1	0	0	0	0	0	0

Unique Supporting table - CatCrtdEffThrsh

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

y/x	250	266	282	298	314	330
1	0	0	0	0	0	0

Unique Supporting table - CatMontrEnbl

Description: Catalyst (CC DOC) monitor enabling calibration as function of the combustion modes

CatMontrEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	0	0	0	0	0	0

CatMontrEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	1	0	0	0

CatMontrEnbl - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

CatMontrEnbl - Part 4

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

Unique Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

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

Unique Supporting table - P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump

Description: Engine Load Stability Weighting Factor - Single Stage Oil Pump

Value Units: Weight factor for engine load stability (none)
X Unit: Engine load stability (milligram)

y/x	399	200	100	50	30	20	10	5	0
1	0.00	0.10	0.25	0.50	0.70	0.50	0.25	0.10	0.00

Unique Supporting table - P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump

Description: Oil Pressure Predicted Weighting Factor - Single Stage Oil Pump

Value Units: Weight factor for engine oil pressure prediction (none)
X Unit: Predicted oil pressure (kPa)

y/x	0	20	35	40	45	55	65	85	110
1	0.00	0.10	0.25	0.50	0.70	0.50	0.25	0.10	0.00

Unique Supporting table - P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump

Description: Oil Temperature Weighting Factor - Single Stage Oil Pump

Value Units: Weight factor for the engine oil temperature (none)
X Unit: Filtered oil temperature (deg C)

y/x	70	85	95	100	105	110	120	130	150
1	0.00	0.10	0.25	0.50	0.70	0.50	0.25	0.10	0.00

Unique Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Value Units: Nominal high state oil pressure (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	449.0	393.0	344.0	271.0	234.0	200.0	189.0	179.0	155.0
1,250.0	472.0	440.0	408.0	377.0	340.0	270.0	261.0	253.0	237.0
1,260.0	473.0	441.0	409.0	378.0	344.0	270.0	262.0	254.0	238.0
1,500.0	485.0	460.0	426.0	412.0	390.0	347.0	343.0	310.0	310.0
2,000.0	493.0	483.0	474.0	462.0	450.0	429.0	421.0	413.0	410.0
2,500.0	509.0	496.0	484.0	470.0	459.0	445.0	437.0	428.0	433.0
3,000.0	520.0	510.0	495.0	499.0	492.0	479.0	469.0	459.0	449.0
3,500.0	558.0	543.0	528.0	514.0	498.0	494.0	482.0	470.0	460.0
4,000.0	549.0	535.0	520.0	510.0	492.0	487.0	473.0	459.0	455.0

Unique Supporting table - P0521_RPM_Weighting_Factor - Single Stage Oil Pump

Description: Engine RPM Weighting Factor - Single Stage Oil Pump

Value Units: Weight factor for the given engine speed (none)
X Unit: Filtered engine speed (RPM)

y/x	700	1,000	1,500	1,700	1,800	2,000	2,500	3,000	3,500
1	0.00	0.10	0.25	0.50	0.70	0.50	0.25	0.10	0.00

Unique Supporting table - P0531_Coolant_Weighting_Factor

Description: Coolant Weighting Factor for Delta Predicted AC Pressure

Value Units: Coeffficient
X Unit: Engine Coolant Temperature (Deg C) KnACCD_T_HSPRat_EngageTstCool

y/x	-20	0	20	60	60	60	60	60	100
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Unique Supporting table - P0531_Delta_Predicted_ Pressure

Description: AC High Side Pressure Sensor Sensor Engage Test Predicted Delta Pressure

Value Units: Predicted A/C high side pressure change during engage test (kPa)
X Unit: Ambient Temperature (Deg C) KnACCD_T_HSPRat_EngageTstAmb
Y Units: Vehicle Speed (km/h) KnACCD_v_HSPRat_EngageTstVehSpd

y/x	-20	0	20	60	60	60	60	60	100
0	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
5	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
20	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
50	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
50	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
50	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
50	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
50	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
100	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00

Unique Supporting table - P0531_Delta_Predicted_Quality_Factor

Description: Delta Predicted Qualtiy Factor for the Engage Test

Value Units: Coeffficient
X Unit: Ambient Temperature (Deg C) KnACCD_T_HSPRat_EngageTstAmb
Y Units: Vehicle Speed (km/h) KnACCD_v_HSPRat_EngageTstVehSpd

y/x	-20	0	20	60	60	60	60	60	100
0	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
5	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
20	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
50	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
50	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
50	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
50	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
50	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
100	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998

Unique Supporting table - P0531_FanSpeed_Weighting_Factor

Description: FanSpeed Weighting Factor for Delta Predicted AC Pressure

Value Units: Coeffficient
X Unit: Cooling Fan Duty Cycle (Pct) KnACCD_Pct_HSPRat_EngageTstFan

y/x	0	5	20	50	50	50	50	50	100
1	1	1	1	1	1	1	1	1	1

Unique Supporting table - P06DD_P06DE_MaxEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Max Enable Threshold

Value Units: Maximum engine torque (Nm)
X Unit: Engine speed (RPM)

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	100.0	132.5	145.0	155.0	140.0	90.0	100.0	100.0	0.0

Unique Supporting table -P06DD_P06DE_MinEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Min Enable Threshold

Value Units: Min engine torque (Nm)
X Unit: Engine speed (RPM)

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P06DD_P06DE_MinOilPressThresh

Description: Intrusive diagnostic minimum pressure limit that is a function of Engine Speed and Oil Temperature

Value Units: Minimum engine oil pressure threshold (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40	50	60	70	80	90	100	110	120
1,000	50	50	50	50	50	50	50	50	50
1,250	55	55	55	55	55	55	55	55	55
1,260	55	55	55	55	55	55	55	55	55
1,500	60	60	60	60	60	60	60	60	60
2,000	70	70	70	70	70	70	70	70	70
2,500	80	80	80	80	80	80	80	80	80
3,000	120	120	120	120	120	120	120	120	120
3,500	140	140	140	140	140	140	140	140	140
4,000	160	160	160	160	160	160	160	160	160

Unique Supporting table - P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Value Units: Nominal low state oil pressure (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40	50	60	70	80	90	100	110	120
1,000	209	200	195	193	185	179	176	170	167
1,250	213	205	202	199	194	189	185	180	175
1,260	213	205	203	200	195	190	186	181	176
1,500	217	208	207	205	200	195	189	184	179
2,000	222	215	215	213	208	205	202	198	195
2,500	226	223	220	218	214	212	209	206	203
3,000	228	226	224	222	219	214	210	205	200
3,500	228	226	224	222	219	214	210	205	201
4,000	228	226	224	222	219	214	210	205	201

Unique Supporting table - P06DD_P06DE_OP_StateChangeMin

Description: Minimum allowed pressure change on a Two Stage Oil Pump state change

Value Units: Min pressure change (kPa)
X Unit: Engine oil temperature (deg C)

y/x	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	50.0	40.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0
1,250.0	70.0	60.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
1,260.0	70.0	60.0	50.0	40.0	30.0	20.0	10.0	0.0	0.0
1,500.0	85.0	85.0	85.0	81.0	60.0	46.0	30.0	0.0	0.0
2,000.0	129.0	129.0	110.0	90.0	80.0	65.0	50.0	0.0	0.0
2,500.0	140.0	130.0	120.0	112.0	92.0	78.0	62.0	0.0	0.0
3,000.0	150.0	140.0	130.0	120.0	100.0	90.0	75.0	0.0	0.0
3,500.0	160.0	150.0	140.0	130.0	115.0	105.0	90.0	0.0	0.0
4,000.0	160.0	150.0	150.0	140.0	130.0	120.0	110.0	0.0	0.0

Unique Supporting table - P156A_Off_Test_Delay

Description: Delay time for AC High Side Pressure Rationality

Value Units: Delay time before running off test (seconds)
X Unit: Ambient Temperature (Deg C) KnACCD_T_HSP_RatOffTestPresMax

y/x	-20.0	0.0	20.0	60.0	100.0
1.0	20.0	20.0	20.0	20.0	20.0

Unique Supporting table - P156A_Off_Test_Threshold

Description: AC High Side Pressure Sensor Rationality Off Test Threshold

Value Units: A/C high side pressure (kPa)
X Unit: Ambient Temperature (Deg C) KnACCD_T_HSP_RatOffTestPresMax

y/x	-20	0	20	60	100
1	300	350	400	450	500

Unique Supporting table - P156B_On_Test_Threshold

Description: AC High Side Pressure Sensor Rationality On Test Threshold

Value Units: A/C high side pressure (kPa)
X Unit: Ambient Temperature (Deg C) KnACCD_T_HSPRat_OnTestPresMin

y/x	-20	0	20	60	100
1	300.0	350.0	400.0	450.0	500.0

Unique Supporting table - P156C_Cold_Test_Threshold

Description: AC High Side Pressure Sensor Rationality Cold Test Threshold

Value Units: A/C high side pressure (kPa)
X Unit: Ambient Temperature (Deg C) KnACCD_T_HSPRat_ColdTestTarget

y/x	-20	0	20	60	100
1	300	350	400	450	500

Bundle Name: 5VoltReferenceB_FA
P0651
Bundle Name: AAP_AAP2_SnsrStabFA
P227E
Bundle Name: AAP_AAP5_SnsrCktFA
P2228, P2229
Bundle Name: AAP_AAP5_SnsrStabFA
P2230
Bundle Name: AAP_AmbientAirPresDfltd
P2227, P2228, P2229, P2230, P00C7
AAP_AmbientAirPresDfltd - Other Definitions:
Bundle Name: AAP_AmbPresSnsrTFTKO
P2227, P2228, P2229, P2230, P00C7
AAP_AmbPresSnsrTFTKO - Other Definitions:
Bundle Name: AAP_SnsrCktFA
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
Bundle Name: AAP_SnsrCktFP
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
Bundle Name: AAP_SnsrFA
Naturally Aspirated: P2227, P2228, P2229, P2230. Turbocharged: P0237, P0238.
Bundle Name: AAP2_SnsrCktFA
P2228, P2229
Bundle Name: AAP2_SnsrCktFP
P2228, P2229
Bundle Name: AAP2_SnsrFA
P2227, P2228, P2229, P2230
Bundle Name: AAP3_SnsrCktFA
P222C, P222D
Bundle Name: AAP3_SnsrCktFP
P222C, P222D
Bundle Name: AccCktLo_FA
P2537
Bundle Name: AIC_AirCntrlShtOffAction
AIC_AirCntrlShtOffAction - Other Definitions: Enumerative that is set to CeAICR_e_CntrlActv (air control is in closed loop) if NONE of the following conditions are verified:

1. Air control is shut off due to an air system fault
2. Engine mode is ready
3. Engine mode is cranking
4. HP EGR actuator, LP EGR actuator or Throttle actuator are NOT available
5. Zero torque condition is active (for all combustion modes except for the Rich ones)
6. EGR control request is maximum: TRUE if Air setpoint = 3,000.00 [mg]
7. Large injected fuel condition is active:
   FALSE for SCR service check, C2, C3 DeSOx Rich, DeNOx combustion modes.
   For other combustion modes, it is TRUE if Fuel request is higher than a high threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Fuel request drops below a low threshold.

   These thresholds depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode), which are function of the engine speed:

   - D1 and D3:
     - High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3** [mm^3]
     - Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3** [mm^3]
   - D2 and D4:
     - High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for D2 and D4** [mm^3]
     - Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for D2 and D4** [mm^3]
   - DeSOx Lean:
     - High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for L3** [mm^3]
     - Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for L3** [mm^3]
   - SCR modes:
     - High: **AIC_AirCntrlShtOffActn: Fuel High Threshold for SCR** [mm^3]
     - Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for SCR** [mm^3]
   - All other modes:
     - High: **AIC_AirCntrlShtOffActn:Fuel High Threshold for others** [mm^3]
     - Low: **AIC_AirCntrlShtOffActn: Fuel Low Threshold for others** [mm^3]

8. Engine Coolant Temperature too high condition is active:
   FALSE for SCR service check, DeSOx Rich, DeNOx combustion modes.
   For other combustion modes, it is TRUE if Engine Coolant Temperature is higher than a high threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Engine Coolant Temperature drops below a low threshold.

   These thresholds depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode):

   - DPF and HCS modes:
     - High: 129.00 [°C]
     - Low: 126.00 [°C]
   - DeSOx Lean:
     - High: 129.00 [°C]
     - Low: 126.00 [°C]
   - C3:
     - High: 129.00 [°C]
     - Low: 126.00 [°C]
   - SCR modes:
     - High: 129.00 [°C]
     - Low: 126.00 [°C]
   - All other modes:

- High: 129.00 [°C]
- Low: 126.00 [°C]

9. Engine Coolant Temperature too low condition is active:
If Engine coolant temperature is NOT higher than the global temperature threshold for OBDII market (OBD Coolant Enable Criteria==FALSE) AND ECT_TooLow==TRUE:
This is FALSE for SCR service check, DeSOx Rich, DeNOx combustion modes.
For other combustion modes, it is TRUE if Engine Coolant Temperature is lower than a low threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Engine Coolant Temperature goes above a high threshold.

These thresholds depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode):

- DPF and HCS modes (thresholds depending on the Outside Air Temperature):
  - High: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF** [°C]
  - Low: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF** [°C]
- DeSOx Lean:
  - High: 13.00 [°C]
  - Low: 10.00 [°C]
- C3:
  - High: 13.00 [°C]
  - Low: 10.00 [°C]
- SCR modes (thresholds depending on the Outside Air Temperature):
  - High: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for SCR** [°C]
  - Low: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for SCR** [°C]
- All other modes (thresholds depending on the Outside Air Temperature):
  - High: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others** [°C]
  - Low: **AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others** [°C]

10. Intake Air Temperature too high condition is active:
FALSE for DeSOx Rich, DeNOx combustion modes.
For other combustion modes, it is TRUE if Intake Air Temperature is higher than a high threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Intake Air Temperature drops below a low threshold.

These thresholds depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode):

- DPF and HCS modes:
  - High: 90.00 [°C]
  - Low: 80.00 [°C]
- SCR service check mode:
  - High: 90.00 [°C]
  - Low: 80.00 [°C]
- DeSOx Lean:
  - High: 90.00 [°C]
  - Low: 80.00 [°C]
- SCR modes:
  - High: 90.00 [°C]
  - Low: 80.00 [°C]
- All other modes:
  - High: 90.00 [°C]

- Low: 80.00 [°C]

11. Intake Air Temperature too low condition is active:
FALSE for DeSOx Rich, DeNOx combustion modes.
For other combustion modes, it is TRUE if Intake Air Temperature is lower than a low threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Intake Air Temperature goes above a high threshold.

These thresholds depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode):

- DPF and HCS modes:
  - High: -50.00 [°C]
  - Low: -60.00 [°C]
- SCR service check mode:
  - High: -50.00 [°C]
  - Low: -60.00 [°C]
- DeSOx Lean:
  - High: -50.00 [°C]
  - Low: -60.00 [°C]
- SCR modes:
  - High: -50.00 [°C]
  - Low: -60.00 [°C]
- All other modes:
  - High: -50.00 [°C]
  - Low: -60.00 [°C]

12. Ambient pressure too low condition is active:
FALSE for DPF and HCS, SCR service check, LNT (DeNOx, DeSOx Rich and DeSOx Lean) combustion modes.
For other combustion modes, it is TRUE if Ambient Pressure is lower than a low threshold, with hysteresis: if the condition is TRUE, then it remains TRUE until the Ambient Pressure goes above a high threshold.

These thresholds depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode):

- SCR modes:
  - High: 72.00 [kPa]
  - Low: 70.00 [kPa]
- C3:
  - High: 72.00 [kPa]
  - Low: 70.00 [kPa]
- All other modes:
  - High: 72.00 [kPa]
  - Low: 70.00 [kPa]

13. Overlong idle condition is active:
FALSE for DPF, SCR service check, LNT (DeNOx, DeSOx Rich and DeSOx Lean) combustion modes.
For other combustion modes, it is TRUE if Engine Speed is lower than a threshold and this condition lasts for a calibrate-able timer.

The threshold and the timer depend on specific calibrations, related to different combustion modes (look at the variable VeAICR_e_CombMode):

- SCR modes:

- Threshold: 560.00 [rpm]
- Timer: 409.59 [s]

o All other modes:

- Threshold: 560.00 [rpm]
- Timer: 409.59 [s]

14. MAF drift intrusive test is requested:
TRUE if the following conditions (in AND) are satisfied:
- MAF sensor rationality monitoring - intrusive airflow drift test is enabled (see the documentation related to P0101)
- Engine is in idle: 560.00 [rpm] < engine speed < 1,000.00 [rpm]
  for a debouncing time > 10.00 [s]
- Intake Manifold Pressure is steady state: |IntkPres – IntkPres_old| < 3.00 [kPa]
- Intake Manifold Pressure is in range: 69.60 [kPa] < IntkPres < 130.00 [kPa]

Conditions from 7 to 14 in AND with: Exhaust Gas Overtemperature NOT detected (EGT_ExhOverTemp==FALSE)

Conditions 8 and from 10 to 12 also in AND with (EOBD only): EGR intrusive test NOT enabled

Bundle Name: AIC_AirDvtnTFTKO
OBDII: P0400. EOBD: P0401, P0402.
Bundle Name: AIC_AirShtOffReq
AIC_AirShtOffReq - Other Definitions: AAP_AmbientAirPresDfltd, AAP_AmbPresSnsrTFTKO, ECT_Sensor_FA, ECT_Sensor_TFTKO, MnfdTempSensorFA, MnfdTempSensorTFTKO, CrankSensor_FA, CrankSensor_TFTKO, LPE_TempSnsrFA, LPE_TempSnsrTFTKO, MAF_MAF_SnsrCktFlt, MAF_MAF_SnsrOfstFA, MAF_MAF_SnsrOfstTFTKO, MAF_MAF_SnsrPerfFA, MAF_MAF_SnsrPerfTFTKO, MAP_EngOffPressFA, MAP_EngOffPressTFTKO, MAP_SensorFA, MAP_SensorTFTKO, CEB_ActrCktLoFlt, EGR_IntkTempTooHiTFTKO, EGR_PstnShtOffReq, FUL_GenericInjSysFA, LPE_PstnShtOffReq, TPS_PstnShtOffReq, AIC_BstActrsDiagShtOff, AIC_AirDvtnTFTKO, DPF_FR_LoFA, DPF_DPF_EffMontrFA , (LPE_VlvOvrHtTFTKO AND NOT EGT_ExhOverTemp)
Bundle Name: AIC_BstActrsDiagShtOff
AIC_BstActrsDiagShtOff - Other Definitions: VGT_ActrDiagShtOff, WGA_ActrDiagShtOff, HTB_ActrDiagShtOff, HCB_ActrDiagShtOff
Bundle Name: AIC_BstCntrlCL
AIC_BstCntrlCL - Other Definitions: Refer to "Boost Control in Closed Loop" Free Form
Bundle Name: AIC_BstSysDiagDenomDsbl
EOBD: P226B.
AIC_BstSysDiagDenomDsbl - Other Definitions: VGT_ActrDiagShtOffFA, WGA_ActrDiagShtOffFA, HTB_ActrDiagShtOffFA, HCB_ActrDiagShtOffFA, MAP_SensorFA, TPS_PstnDvtnFA, AAP_AmbientAirPresDfltd, AIC_OAT_SignalFA, ECT_Sensor_FA, TPS_PstnSnsrFA
Bundle Name: AIC_BstSysDiagShtOff

OBDII: P2263. EOBD: P226B, P0234, P0299.
AIC_BstSysDiagShtOff - Other Definitions: MAP_SensorFA, MAP_SensorTFTKO, TPS_PstnDvtnFA, TPS_PstnDvtnTFTKO
Bundle Name: AIC_EGR_FlowDiagAirTempFA
AIC_EGR_FlowDiagAirTempFA - Other Definitions: Depending on CeAICR_e_OutsideTemp : IAT_SensorFA, MnfdTempSensorFA, AIC_OAT_SignalFA
Bundle Name: AIC_GenericBstSysFlt
OBDII: P2263. EOBD: P226B, P0234, P0299.
AIC_GenericBstSysFlt - Other Definitions: VGT_ActrDiagShtOff, WGA_ActrDiagShtOff, HTB_ActrDiagShtOff, HCB_ActrDiagShtOff, MAP_SensorFA, MAP_SensorTFTKO, TPS_PstnDvtnFA, TPS_PstnDvtnTFTKO
Bundle Name: AIC_OAT_SignalFA
AIC_OAT_SignalFA - Other Definitions: EOBD: OAT_OAT_SnsrNonEmissFA. OBDII: OAT_PtEstFiltFA.
Bundle Name: AmbPresDfltdStatus
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
Bundle Name: AnyCamPhaser_FA
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF,
Bundle Name: AnyCamPhaser_TFTKO
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF,
Bundle Name: CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: CamSensorAnyLctnTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CAN_LostComm_FltN_BusB_DEF_C
U010E
Bundle Name: CAN_LostComm_FltN_BusB_NOxSnsr_A
U029D
Bundle Name: CAN_LostComm_FltN_BusB_NOxSnsr_B
U029E
Bundle Name: CAT_Cat2_PresDropFlt

CAT_Cat2_PresDropFlt - Other Definitions: EGT_ClstSnsrCat2_UpFlt || EXF_TotExhCat2_UpFlt || EGP_PresCat2_DwnFlt
Bundle Name: CAT_Cat2_SysEffLoB1_FA
P0422
Bundle Name: CAT_CatPresDropFlt
CAT_CatPresDropFlt - Other Definitions: EGT_SnsrCatUpFlt || EXF_TotExhCatUpFlt || EGP_PresCatDwnFlt
Bundle Name: CAT_CatSysEffLoB1_FA
P0421
Bundle Name: CAT_HC_Cat2_DwnFlt
CAT_HC_Cat2_DwnFlt - Other Definitions: HCI_HC_dm_Cat2_UpFlt || OXY_O2_Cat2_UpFlt || EXF_TotExhCat2_UpFlt || EGT_TempCat2_UpFlt || EGP_PresCat2_UpFlt || AmbientAirDefault || VehicleSpeedSensor_FA || CAT_OutsideTempFA
Bundle Name: CAT_NOx_ppm_Cat2_DwnFlt
CAT_NOx_ppm_Cat2_DwnFlt - Other Definitions: NOX_NOx_ppm_Cat2_UpFlt
Bundle Name: CAT_NOx_ppm_CatDwnFlt
CAT_NOx_ppm_CatDwnFlt - Other Definitions: NOX_NOx_SnsrCatUpFlt
Bundle Name: CAT_NOx_Rat_Cat2_DwnFlt
CAT_NOx_Rat_Cat2_DwnFlt - Other Definitions: HCI_HC_dm_Cat2_UpFlt || OXY_O2_Cat2_UpFlt || NOX_NOx_Rat_Cat2_UpFlt || EXF_TotExhCat2_UpFlt || EGT_TempCat2_UpFlt
Bundle Name: CAT_NOx_Rat_CatDwnFlt
CAT_NOx_Rat_CatDwnFlt - Other Definitions: FUL_GenericInjSysFlt || if SootLoading then OXY_O2_SnsrCatUpFlt else OXY_O2_CatUpFlt || NOX_NOx_Rat_CatUpFlt || CrankSensor_TFTKO & CrankSensor_FA || EXF_TotExhCatUpFlt || ECT_Sensor_FA & ECT_Sensor_TFTKO || EGT_SnsrCatUpFlt
Bundle Name: CAT_O2_Cat2_DwnFlt
CAT_O2_Cat2_DwnFlt - Other Definitions: OXY_O2_Cat2_UpFlt || EXF_TotExhCat2_UpFlt || HCI_HC_dm_Cat2_UpFlt || EGT_TempCat2_UpFlt || EGP_PresCat2_UpFlt || AmbientAirDefault || VehicleSpeedSensor_FA || CAT_OutsideTempFA
Bundle Name: CAT_O2_CatDwnFlt
CAT_O2_CatDwnFlt - Other Definitions: if SootLoading then OXY_O2_SnsrCatUpFlt else OXY_O2_CatUpFlt || EXF_TotExhCatUpFlt || HCI_HC_dm_CatUpFlt || EGT_SnsrCatUpFlt || EGP_PresCatUpFlt || AmbientAirDefault ||

VehicleSpeedSensor_FA || CAT_OutsideTempFA
Bundle Name: CAT_OutsideTempFA
CAT_OutsideTempFA - Other Definitions: OAT_PtEstFiltFA
Bundle Name: CAT_PM_Cat2_DwnFlt
CAT_PM_Cat2_DwnFlt - Other Definitions: SOT_PM_Cat2_UpFlt
Bundle Name: CAT_PM_CatDwnFlt
CAT_PM_CatDwnFlt - Other Definitions: SOT_PM_CatUpFlt
Bundle Name: CAT_TempCat2_DwnFlt
CAT_TempCat2_DwnFlt - Other Definitions: HCI_HC_dm_Cat2_UpFlt || OXY_O2_Cat2_UpFlt || EXF_TotExhCat2_UpFlt || EGT_TempCat2_UpFlt || AmbientAirDefault || VehicleSpeedSensor_FA || CAT_OutsideTempFA
Bundle Name: CAT_TempCatDwnFlt
CAT_TempCatDwnFlt - Other Definitions: HCI_HC_dm_CatUpFlt || if SootLoading then OXY_O2_SnsrCatUpFlt else OXY_O2_CatUpFlt || EXF_TotExhCatUpFlt || EGT_SnsrCatUpFlt || AmbientAirDefault || VehicleSpeedSensor_FA || CAT_OutsideTempFA
Bundle Name: CEB_ActrCktLoFA
P245C
Bundle Name: CEB_ActrCktLoFlt
P245C
Bundle Name: CEB_ActrFlt
P245C, P245D, P245A, P1413, P1438, P1414, P2AA5
Bundle Name: CEB_MtrCurrLimTFTKO
P1414
Bundle Name: CEB_ObstructionTFTKO
P245B
Bundle Name: CEB_PstnSnsrFlt
P2494, P2495, P24C4
Bundle Name: CET_DNSS_FA
P142A, P1429, P040E, P040C, P040D, P040B
Bundle Name: CET_DNSS_TFTKO
P142A, P1429, P040E, P040C, P040D, P040B
Bundle Name: CET_UPSS_FA

P1427, P1428, P041C, P041D, P041E, P041B
Bundle Name: CET_UPSS_TFTKO
P1427, P1428, P041C, P041D, P041E, P041B
Bundle Name: CFM_VGT_CommFA
P100A
Bundle Name: CFM_VGT_CommTFTKO
P100A
Bundle Name: CIT_CAC_DwnCktFA
P10D7, P10D6
Bundle Name: CIT_CAC_DwnFA
P10D6, P10D7, P10D8, P10D5
Bundle Name: CIT_CAC_DwnSelfCorFA
P10D8
Bundle Name: CIT_CAC_UpCktFA
P007D, P007C
Bundle Name: CIT_CAC_UpFA
P007D, P007C, P007E, P007B
Bundle Name: CIT_CAC_UpSelfCorFA
P007E
Bundle Name: ClchPstnSnsrPerf FA
P0806
Bundle Name: ClutchPstnSnsr FA
P0806, P0807, P0808
Bundle Name: ClutchPstnSnsrNotLearned
P080A
Bundle Name: CrankSensor_FA
P0335, P0336
Bundle Name: CrankSensor_TFTKO
P0335, P0336
Bundle Name: DPF_DPF_EffMontrFA
P2459
DPF_DPF_EffMontrFA - Other Definitions:
Bundle Name: DPF_DPF_St
DPF_DPF_St - Other Definitions: DPF_DPF_St is equal to: - Soot Loading modes (no DPF regeration) if DPF_EnblDPF= 0 - Regeneration modes if DPF_EnblDPF = 1

Bundle Name: DPF_EnblDPF
DPF_EnblDPF - Other Definitions: DPFR_EnblDPF = 1 if: - Combustion mode is DPF Regeneration modes.
Bundle Name: DPF_FR_CalcDsbl
DPF_FR_CalcDsbl - Other Definitions: EGT_SnsrDPF_UpFlt OR EGP_DiffPresSnsrFlt OR EXF_TotExhDPF_UpFlt OR AmbPresDfltdStatus
Bundle Name: DPF_FR_LoFA
P2262
DPF_FR_LoFA - Other Definitions:
Bundle Name: DPF_LastRgnAvg
DPF_LastRgnAvg - Other Definitions: DPF_LastRgnAvg is calculated as the average distance between two completed regenerations.
Bundle Name: DPF_NOx_dm_DPF_UpFlt
DPF_NOx_dm_DPF_UpFlt - Other Definitions: NOX_NOx_ppm_DPF_UpFlt OR EXF_TotExhDPF_UpFlt
Bundle Name: DPF_O2_DPF_DwnFlt
DPF_O2_DPF_DwnFlt - Other Definitions: if 1.00 = 1 (NOT (NOT NOX_NOx_Rat_DPF_UpFlt AND NOT(EXF_TotExhDPF_UpFlt)AND NOT(VehicleSpeedSensor_FA) AND NOT(EGT_SnsrDPF_UpFlt) AND NOT (HCI_HC_dm_DPF_UpFlt) AND NOT(EXM_EQR_ExhMnfdNotVld) AND NOT(OAT_PtEstFiltFA) AND NOT(EGP_DiffPresSnsrFlt OR AmbPresDfltdStatus) AND NOT (EGT_TempCat2_DwnFlt) AND NOT (OXY_O2_DPF_UpFlt) AND NOT(1.00 =1 AND SOT_PM_DPF_UpFlt)AND NOT (DPF_NOx_dm_DPF_UpFlt)) if 1.00 = 1 (EXF_TotExhDPF_UpFlt OR EGT_SnsrDPF_UpFlt OR HCI_HC_dm_DPF_UpFlt OR EGP_DiffPresSnsrFlt OR AmbPresDfltdStatus OR OXY_O2_DPF_UpFlt) if (1.00 = 0 AND 1.00 = 0) THEN (EGT_SnsrDPF_UpFlt OR EXF_TotExhDPF_UpFlt OR (EGP_DiffPresSnsrFlt OR AmbPresDfltdStatus OR OXY_O2_DPF_UpFlt)
Bundle Name: DPF_PM_DPF_DwnFlt
DPF_PM_DPF_DwnFlt - Other Definitions: False
Bundle Name: DPF_ResistFlowCalcOff
DPF_ResistFlowCalcOff - Other Definitions: refer to **Control Flags Tab**
Bundle Name: DPF_ResistFlowFltd

DPF_ResistFlowFltd - Other Definitions: refer to **Control Flags Tab**
Bundle Name: DPF_TempDPF_DwnFlt
DPF_TempDPF_DwnFlt - Other Definitions: NOT(NOT EGP_PresDPF_UpFlt AND NOT EXF_TotExhDPF_UpFlt AND NOT VehicleSpeedSensor_FA AND NOTEGT_SnsrDPF_UpFlt AND NOT OAT_PtEstFiltFA AND NOT HCI_HC_dm_DPF_UpFlt AND NOT EXM_EQR_ExhMnfdNotVld AND NOT EGT_TempCat2_DwnFlt)
Bundle Name: DQMR_DEFQS_ElecFlt
P1018, P1019, P101A
Bundle Name: DQMR_DEFQS_PZT_ElecFlt
P206C, P206D
Bundle Name: DQMR_DEFQS_SENT_ElecFA
P1015, P1016
Bundle Name: DQMR_DEFQS_SENT_ElecFlt
P1015, P1016
Bundle Name: DQMR_DEFQS_SENT_PerfFA
P1017
Bundle Name: DQMR_DEFQS_TempFlt
P2ADA, P2ADB, P2ADC, P2ADD
Bundle Name: ECT_Sensor_Ckt_FA
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_FP
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_TFTKO
P0117, P0118
Bundle Name: ECT_Sensor_DefaultDetected
P0116, P0117, P0118, P0119, P111E
Bundle Name: ECT_Sensor_FA
P0116, P0117, P0118, P0119, P0128, P111E
Bundle Name: ECT_Sensor_Perf_FA
P0116, P111E
Bundle Name: EGP_DiffPresOfstTFTKO
P2452
Bundle Name: EGP_DiffPresQckChgFlt
P2456
Bundle Name: EGP_DiffPresSnsrCktFlt
P2454, P2455
Bundle Name: EGP_DiffPresSnsrFA

P2452, P2453, P2454, P2455, P2456
Bundle Name: EGP_DiffPresSnsrFlt
P2452, P2453, P2454, P2455, P2456
Bundle Name: EGP_DiffPresSnsrRatFlt
P2453
EGP_DiffPresSnsrRatFlt - Other Definitions: EGP_DiffPresSnsrFA **and with** EGP_DiffPresSnsrTFTKO
Bundle Name: EGP_DiffPresSnsrTFTKO
P2453, P2454, P2455
Bundle Name: EGP_DiffPresStkFltPresent
P2453
Bundle Name: EGP_PresCat2_DwnFlt
EGP_PresCat2_DwnFlt - Other Definitions: EGP_DiffPresSnsrFlt, EXF_TotExhMufflerUpFlt, EGT_SnsrDPF_DwnFlt, (AAP_AmbPresSnsrTFTKO in AND with AAP_AmbientAirPresDfltd)
Bundle Name: EGP_PresCat2_UpFlt
EGP_PresCat2_UpFlt - Other Definitions: CAT_Cat2_PresDropFlt, EGP_PresDPF_UpFlt
Bundle Name: EGP_PresCatDwnFlt
EGP_PresCatDwnFlt - Other Definitions: EGP_PresDEFMV_UpFlt, EPM_PresPipe1_DropFlt
Bundle Name: EGP_PresCatUpFlt
EGP_PresCatUpFlt - Other Definitions: CAT_CatPresDropFlt, EGP_PresCatDwnFlt
Bundle Name: EGP_PresDEFMV_DwnFlt
EGP_PresDEFMV_DwnFlt - Other Definitions: EPM_PresPipe2_DropFlt, EGP_PresSCR_UpFlt
Bundle Name: EGP_PresDEFMV_UpFlt
EGP_PresDEFMV_UpFlt - Other Definitions: SCR_DEFMV_PresDropFlt, EGP_PresDEFMV_DwnFlt
Bundle Name: EGP_PresDPF_DwnFlt
EGP_PresDPF_DwnFlt - Other Definitions: AAP_AmbPresSnsrTFTKO in AND with AAP_AmbientAirPresDfltd

Bundle Name: EGP_PresDPF_UpFlt
EGP_PresDPF_UpFlt - Other Definitions: EGP_DiffPresSnsrFlt, EXF_TotExhMufflerUpFlt, EGT_SnsrDPF_DwnFlt, (AAP_AmbPresSnsrTFTKO in AND with AAP_AmbientAirPresDfltd)
Bundle Name: EGP_PresHCI_UpFlt
EGP_PresHCI_UpFlt - Other Definitions: EPM_PresPipe4_DropFlt, EGP_PresCat2_UpFlt
Bundle Name: EGP_PresLPE_UpFlt
EGP_PresLPE_UpFlt - Other Definitions: EGP_PresDPF_DwnFlt
Bundle Name: EGP_PresSCR_DwnFlt
EGP_PresSCR_DwnFlt - Other Definitions: EPM_PresPipe3_DropFlt, EGP_PresHCI_UpFlt
Bundle Name: EGP_PresSCR_UpFlt
EGP_PresSCR_UpFlt - Other Definitions: SCR_SCR_PresDropFlt, EGP_PresSCR_DwnFlt
Bundle Name: EGP_PresTurbDwnFlt
EGP_PresTurbDwnFlt - Other Definitions: CAT_CatPresDropFlt, EGP_PresCatDwnFlt
Bundle Name: EGR_IntkTempTooHiTFTKO
P0127
EGR_IntkTempTooHiTFTKO - Other Definitions: Stubbed to FALSE in OBDII applications
Bundle Name: EGR_MtrCurrLimTFTKO
P140F
Bundle Name: EGR_PstnShtOffReq
P0403, P0405, P0406, P042E, P042F, P049D, P0489, P0490, P1402, P1407, P140F, P1424
Bundle Name: EGR_PstnShtOffReqFA
P0403, P0405, P0406, P042E, P042F, P049D, P0489, P0490, P1402, P1407, P140F, P1424
Bundle Name: EGR_PstnSnsrFA
P0405, P0406, P049D
Bundle Name: EGR_PstnSnsrFlt
P0405, P0406, P049D
Bundle Name: EGR_VlvTempNotVld

EGR_VlvTempNotVld - Other Definitions: CET_DNSS_FA, CET_DNSS_TFTKO, CET_UPSS_FA, CET_UPSS_TFTKO
Bundle Name: EGR_VlvTotFlowFA
P0405, P0406, P049D
EGR_VlvTotFlowFA - Other Definitions: INM_IntkGapNotValid
Bundle Name: EGR_VlvTotFlowNomNotVld
P0405, P0406, P049D
EGR_VlvTotFlowNomNotVld - Other Definitions: EGR_VlvTempNotVld, MAP_SensorFA, MAP_SensorTFTKO, EXM_ExhMnfdPresNotVld
Bundle Name: EGR_VlvTotFlowNotValid
P0405, P0406, P049D
EGR_VlvTotFlowNotValid - Other Definitions: INM_IntkGapNotValid
Bundle Name: EGT_Avg
EGT_Avg - Other Definitions: refer to **Control Flags Tab**
Bundle Name: EGT_ClstSnsrCat2_UpFlt
P242D, P242C, P242E, P242B, P113D, P1196
EGT_ClstSnsrCat2_UpFlt - Other Definitions:
Bundle Name: EGT_DsblCL
EGT_DsblCL - Other Definitions: refer to **Control Flags Tab**
Bundle Name: EGT_EGT1_DiagMdlFlt
EGT_EGT1_DiagMdlFlt - Other Definitions: EXM_TurbFlowNotValid , CET_UPSS_FA AND CET_UPSS_TFTKO, EXM_ExhMnfdPresNotVld , VGT_PstnSnsrFA AND VGT_PstnSnsrTFTKO
Bundle Name: EGT_EGT2_DiagMdlFlt
EGT_EGT2_DiagMdlFlt - Other Definitions: CAT_TempCatDwnFlt
Bundle Name: EGT_EGT3_DiagMdlFlt
EGT_EGT3_DiagMdlFlt - Other Definitions: EGT_TempSCR_DwnFlt

Bundle Name: EGT_EGT4_DiagMdlFlt
EGT_EGT4_DiagMdlFlt - Other Definitions: CAT_TempCat2_DwnFlt
Bundle Name: EGT_EGT5_DiagMdlFlt
EGT_EGT5_DiagMdlFlt - Other Definitions: DPF_TempDPF_DwnFlt
Bundle Name: EGT_ExhGas1_CktFA
P0546, P0545
Bundle Name: EGT_ExhGas1_CktTFTKO
P0546, P0545
Bundle Name: EGT_ExhGas1_FA
P0546, P0545, P2081, P2080, P113B, P118E
Bundle Name: EGT_ExhGas1_QckChgTFTKO
P2081
Bundle Name: EGT_ExhGas1_StkFA
P2080
Bundle Name: EGT_ExhGas1_StkTFTKO
P2080
Bundle Name: EGT_ExhGas1_TFTKO
P0546, P0545, P2081, P2080, P113B
Bundle Name: EGT_ExhGas2_CktFA
P2033, P2032
Bundle Name: EGT_ExhGas2_CktTFTKO
P2033, P2032
Bundle Name: EGT_ExhGas2_FA
P2033, P2032, P2085, P2084, P113C, P118F
Bundle Name: EGT_ExhGas2_QckChgFA
P2085
Bundle Name: EGT_ExhGas2_QckChgTFTKO
P2085
Bundle Name: EGT_ExhGas2_TFTKO
P2033, P2032, P2085, P2084, P113C
Bundle Name: EGT_ExhGas3_CktFA
P242D, P242C
Bundle Name: EGT_ExhGas3_CktTFTKO
P242D, P242C

Bundle Name: EGT_ExhGas3_FA
P242D, P242C, P242E, P242B, P113D, P1196
Bundle Name: EGT_ExhGas3_QckChgFA
P242E
Bundle Name: EGT_ExhGas3_QckChgTFTKO
P242E
Bundle Name: EGT_ExhGas3_StkFA
P242B
Bundle Name: EGT_ExhGas3_StkTFTKO
P242B
Bundle Name: EGT_ExhGas3_TFTKO
P242D, P242C, P242E, P242B, P113D
Bundle Name: EGT_ExhGas4_CktFA
P2471, P2470
Bundle Name: EGT_ExhGas4_CktTFTKO
P2471, P2470
Bundle Name: EGT_ExhGas4_FA
P2471, P2470, P2472, P246F, P113E, P1197
Bundle Name: EGT_ExhGas4_QckChgFA
P2472
Bundle Name: EGT_ExhGas4_QckChgTFTKO
P2472
Bundle Name: EGT_ExhGas4_StkFA
P246F
Bundle Name: EGT_ExhGas4_StkTFTKO
P246F
Bundle Name: EGT_ExhGas4_TFTKO
P2471, P2470, P2472, P246F, P113E
Bundle Name: EGT_ExhGas5_CktFA
P2482, P2481
Bundle Name: EGT_ExhGas5_CktTFTKO
P2482, P2481
Bundle Name: EGT_ExhGas5_FA
P2481, P2482, P2483, P2484, P113F, P1198
Bundle Name: EGT_ExhGas5_QckChgFA
P2484
Bundle Name: EGT_ExhGas5_QckChgTFTKO
P2484

Bundle Name: EGT_ExhGas5_StkFA
P2483
Bundle Name: EGT_ExhGas5_StkTFTKO
P2483
Bundle Name: EGT_ExhGas5_TFTKO
P2481, P2482, P2483, P2484, P113F
Bundle Name: EGT_ExhOverTemp
P200C, P200E
Bundle Name: EGT_HC_CL_Enbl
EGT_HC_CL_Enbl - Other Definitions: **EGT_HC_CL_Enbl = 1 if:** - HC Control is enabled (EGT_HC_ControlEnbl = 1) - No Fault on DPF Up Temperature Sensor (EGT_SnsrDPF_UpFlt) - DPF Up Temperature Sensor NOT above threshold KeEGTC_T_DPF_UpTempThrshDsblCL while HC Injection Control PID > 0
Bundle Name: EGT_HC_ControlEnbl
EGT_HC_ControlEnbl - Other Definitions: **EGT_HC_ControlEnbl = 1 if:** **- HC Injector is supported by exhaust layout (**EXC_HCI_Enbl) - Combustion Mode equal to one of allowed modes (DPF) - No Fault on HC Injector (HCI_GenericShtOffReq) - HC Injector control enabled (HCI_HCI_CntrlEnbl)
Bundle Name: EGT_SnsrCat2_DwnFlt
P2470, P2471, P2472, P246F, P113E, P1197
Bundle Name: EGT_SnsrCatDwnFlt
P2033, P2032, P2085, P2084, P113C, P118F
Bundle Name: EGT_SnsrCatUpFlt
P0546, P0545, P2081, P2080, P113B, P118E
Bundle Name: EGT_SnsrDPF_DwnFlt
P2481, P2482, P2483, P2484, P113F, P1198
Bundle Name: EGT_SnsrDPF_DwnPresent
EGT_SnsrDPF_DwnPresent - Other Definitions: GetEGTR_b_SnsrDPF_DwnPresent= 1 if: - If CeEXCR_e_C_UI_SCR_HCI_C_DPF = CeEXCR_C_UI_SCR_HCI_C_DPF and CeEXCR_e_EGT5_DPF_Dwn = CeEXCR_e_EGT5_DPF_Dwn
Bundle Name: EGT_SnsrDPF_UpFA
P2470, P2471, P2472, P246F, P113E, P1197
Bundle Name: EGT_SnsrDPF_UpFlt
P2470, P2471, P2472, P246F, P113E, P1197

Bundle Name: EGT_SnsrDPF_UpTFTKO
P2470, P2471, P2472, P246F, P113E
Bundle Name: EGT_SnsrPipe1_UpFlt
P2033, P2032, P2085, P2084, P113C, P118F
Bundle Name: EGT_SnsrTurbDwnFlt
P0546, P0545, P2081, P2080, P113B, P118E
Bundle Name: EGT_TempAvgVld
EGT_TempAvgVld - Other Definitions: If EGT_TempAvgVld indicates that the reference temperature calculation , EGT_Avg , is on going.
Bundle Name: EGT_TempCat2_DwnFlt
P2470, P2471, P2472, P246F, P113E, P1197
Bundle Name: EGT_TempCat2_UpFlt
EGT_TempCat2_UpFlt - Other Definitions: EPM_TempPipe4_DwnFlt
Bundle Name: EGT_TempDEFMV_UpFlt
EGT_TempDEFMV_UpFlt - Other Definitions: EPM_TempPipe1_UpFlt
Bundle Name: EGT_TempPipe1_UpFlt
EGT_TempPipe1_UpFlt - Other Definitions: (C_UI_SCR_HCI_C_DPF)-->CAT_TempCatDwnFlt (C_DPF_UI_SCR)-->DPF_TempDPF_DwnFlt
Bundle Name: EGT_TempSCR_DwnFlt
EGT_TempSCR_DwnFlt - Other Definitions: SCR_TempSCR_DwnFlt
Bundle Name: EGT_TempSCR_UpFlt
EGT_TempSCR_UpFlt - Other Definitions: EPM_TempPipe2_DwnFlt
Bundle Name: EngineMisfireDetected_FA
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineModeNotRunTimer_FA
P2610
Bundle Name: EngineModeNotRunTimerError
P2610
Bundle Name: EnginePowerLimited

P0068, P00C8, P00C9, P00CA, P0090, P0091, P0092, P0122, P0123, P0191, P0192, P0193, P0222, P0223, P0601, P0604, P0606, P0697, P06A3, P06DB, P06D2, P06DE, P0A1D, P1104, P127A, P127C, P127D, P15F2, P160D, P160E, P1682, P16A0, P16A1, P16A2, P16A7, P16F3, P2100, P2101, P2102, P2103, P2122, P2123, P2127, P2128, P2135, P2138, P215B, P2176, P228C, P228D, U0073, U0074, U0293, U1817
Bundle Name: EngineTorqueEstInaccurate
EngineTorqueEstInaccurate - Other Definitions: FUL_GenericInjSysFlt, FHP_RPS_Flt, EngineMisfireDetected_FA
Bundle Name: EPM_HC_dm_Pipe2_DwnFlt
EPM_HC_dm_Pipe2_DwnFlt - Other Definitions: HCI_HC_dm_Pipe2_UpFlt
Bundle Name: EPM_HC_dm_Pipe4_DwnFlt
EPM_HC_dm_Pipe4_DwnFlt - Other Definitions: HCI_HC_dm_Pipe4_UpFlt
Bundle Name: EPM_NOx_ppm_Pipe4_DwnFlt
EPM_NOx_ppm_Pipe4_DwnFlt - Other Definitions: NOXR_b_NOx_ppm_Pipe4_UpFlt
Bundle Name: EPM_NOx_Rat_Pipe2_DwnFlt
EPM_NOx_Rat_Pipe2_DwnFlt - Other Definitions: NOX_NOx_Rat_Pipe2_UpFlt
Bundle Name: EPM_NOx_Rat_Pipe3_DwnFlt
EPM_NOx_Rat_Pipe3_DwnFlt - Other Definitions: NOX_NOx_Rat_Pipe3_UpFlt
Bundle Name: EPM_NOx_Rat_Pipe4_DwnFlt
EPM_NOx_Rat_Pipe4_DwnFlt - Other Definitions: NOX_NOx_Rat_Pipe4_UpFlt
Bundle Name: EPM_O2_Pipe1_DwnFlt
EPM_O2_Pipe1_DwnFlt - Other Definitions: OXY_O2_Pipe1_UpFlt
Bundle Name: EPM_O2_Pipe2_DwnFlt
EPM_O2_Pipe2_DwnFlt - Other Definitions: (SnsrPipe2_UpPresent)--> OXY_O2_SnsrPipe2_UpFlt else OXY_O2_Pipe2_UpFlt
Bundle Name: EPM_O2_Pipe3_DwnFlt

EPM_O2_Pipe3_DwnFlt - Other Definitions: (SnsrPipe3_UpPresent)-->OXY_O2_SnsrPipe3_UpFlt else OXY_O2_Pipe3_UpFlt
Bundle Name: EPM_O2_Pipe4_DwnFlt
EPM_O2_Pipe4_DwnFlt - Other Definitions: OXY_O2_Pipe4_UpFlt
Bundle Name: EPM_PM_Pipe1_DwnFlt
EPM_PM_Pipe1_DwnFlt - Other Definitions: SOT_PM_Pipe1_UpFlt
Bundle Name: EPM_PM_Pipe2_DwnFlt
EPM_PM_Pipe2_DwnFlt - Other Definitions: SOT_PM_Pipe2_UpFlt
Bundle Name: EPM_PM_Pipe3_DwnFlt
EPM_PM_Pipe3_DwnFlt - Other Definitions: SOT_PM_Pipe3_UpFlt
Bundle Name: EPM_PM_Pipe4_DwnFlt
EPM_PM_Pipe4_DwnFlt - Other Definitions: SOT_PM_Pipe4_UpFlt
Bundle Name: EPM_PresPipe1_DropFlt
EPM_PresPipe1_DropFlt - Other Definitions: Fault flag related to pressure estimation at pipe outlet
Bundle Name: EPM_PresPipe2_DropFlt
EPM_PresPipe2_DropFlt - Other Definitions: Fault flag related to pressure estimation at pipe outlet
Bundle Name: EPM_PresPipe3_DropFlt
EPM_PresPipe3_DropFlt - Other Definitions: Fault flag related to pressure estimation at pipe outlet
Bundle Name: EPM_PresPipe4_DropFlt
EPM_PresPipe4_DropFlt - Other Definitions: Fault flag related to pressure estimation at pipe outlet
Bundle Name: EPM_TempPipe1_UpFlt

EPM_TempPipe1_UpFlt - Other Definitions:
(SnsrPipe1_UpPresent)-->EGT_SnsrPipe1_UpFlt else EGT_TempPipe1_UpFlt

Bundle Name: EPM_TempPipe2_DwnFlt

EPM_TempPipe2_DwnFlt - Other Definitions:
Fault flag related to temperature estimation at pipe outlet

Bundle Name: EPM_TempPipe4_DwnFlt

EPM_TempPipe4_DwnFlt - Other Definitions:
Fault flag related to temperature estimation at pipe outlet

Bundle Name: EXC_HCI_Enbl

EXC_HCI_Enbl - Other Definitions:
EXC_HCI_Enbl = 1 if:
CeEXCR_e_C_UI_SCR_HCI_C_DPF == CeEXCR_e_C_UI_SCR_HCI_C_DPF

Bundle Name: EXF_TotExh_DEFMV_UpFA

EXF_TotExh_DEFMV_UpFA - Other Definitions:
EXM_TurbFlowFA

Bundle Name: EXF_TotExhCat2_UpFlt

EXF_TotExhCat2_UpFlt - Other Definitions:
HCI_TotExh_dm_HCI_DwnFlt

Bundle Name: EXF_TotExhCatUpFlt

EXF_TotExhCatUpFlt - Other Definitions:
EXM_TurbFlowNotValid

Bundle Name: EXF_TotExhDEFMV_UpFlt

EXF_TotExhDEFMV_UpFlt - Other Definitions:
EXM_TurbFlowNotValid

Bundle Name: EXF_TotExhDPF_UpFA

EXF_TotExhDPF_UpFA - Other Definitions:
C_UI_SCR_HCI_C_DPF: HCI_TotExh_dm_HCI_DwnFA; C_DPF_UI_SCR: EXM_TurbFlowFA

Bundle Name: EXF_TotExhDPF_UpFlt

EXF_TotExhDPF_UpFlt - Other Definitions:
C_UI_SCR_HCI_C_DPF: HCI_TotExh_dm_HCI_DwnFlt; C_DPF_UI_SCR: EXM_TurbFlowNotValid

Bundle Name: EXF_TotExhHC_InjUpFA

EXF_TotExhHC_InjUpFA - Other Definitions:
SCR_TotExh_DEFMV_DwnFA

Bundle Name: EXF_TotExhHC_InjUpFlt

EXF_TotExhHC_InjUpFlt - Other Definitions:
SCR_TotExh_DEFMV_DwnFlt

Bundle Name: EXF_TotExhMufflerUpFlt

EXF_TotExhMufflerUpFlt - Other Definitions:
C_UI_SCR_HCI_C_DPF: HCI_TotExh_dm_HCI_DwnFlt; C_DPF_UI_SCR: SCR_TotExh_DEFMV_DwnFlt

Bundle Name: EXF_TotExhSCR_UpFlt

EXF_TotExhSCR_UpFlt - Other Definitions:
SCR_TotExh_DEFMV_DwnFlt

Bundle Name: EXM_CylTotExhMassNotVld

EXM_CylTotExhMassNotVld - Other Definitions:
FUL_GenericInjSysFlt, INM_CylTotFlowNotValid

Bundle Name: EXM_EQR_ExhMnfdNotVld

EXM_EQR_ExhMnfdNotVld - Other Definitions:
MAF_MAF_SnsrFA, MAF_MAF_SnsrTFTKO, FUL_GenericInjSysFlt

Bundle Name: EXM_ExhMnfdPresNotVld

EXM_ExhMnfdPresNotVld - Other Definitions:
EXM_PM_TurbFlowNotVld, EGT_SnsrTurbDwnFlt, CET_UPSS_FA, CET_UPSS_TFTKO, EGP_PresTurbDwnFlt, VGT_PstnSnsrFA, VGT_PstnSnsrTFTKO

Bundle Name: EXM_HC_TurbFlowNotValid

EXM_HC_TurbFlowNotValid - Other Definitions:
FUL_GenericInjSysFlt, EXM_TurbFlowNotValid, ECT_Sensor_FA, ECT_Sensor_TFTKO, OAT_PtEstFiltFA, OAT_OAT_SnsrNonEmissFA, OAT_OAT_SensorTFTKO, EXM_CylTotExhMassNotVld

Bundle Name: EXM_NO2_NOx_ExhMnfdNotVld

EXM_NO2_NOx_ExhMnfdNotVld - Other Definitions:
EGT_SnsrTurbDwnFlt, EXM_O2_ExhMnfdNotValid

Bundle Name: EXM_NOxMdl_ExhMnfdNotVld

EXM_NOxMdl_ExhMnfdNotVld - Other Definitions:

INM_O2_IntkMnfdNotValid, FHP_RPS_Flt, EXM_EQR_ExhMnfdNotVld, FUL_GenericInjSysFlt, FUL_GenericInjSysFA, MnfdTempSensorFA, MnfdTempSensorTFTKO, AAP_AmbientAirPresDfltd, AAP_AmbPresSnsrTFTKO, HumidityFA, HumidityTFTKO, MAP_SensorFA, MAP_SensorTFTKO, EXM_ExhMnfdPresNotVld, HumTempSnsrFA, HumTempSnsrTFTKO
Bundle Name: EXM_O2_ExhMnfdNotValid
EXM_O2_ExhMnfdNotValid - Other Definitions: FUL_GenericInjSysFlt, INM_CylAirFlowNotValid, EXM_CylTotExhMassNotVld
Bundle Name: EXM_PM_TurbFlowNotRlb
EXM_PM_TurbFlowNotRlb - Other Definitions: OXY_eqr_TurbDwnNotRlb, OXY_eqr_TurbDwnNotVld
Bundle Name: EXM_PM_TurbFlowNotVld
EXM_PM_TurbFlowNotVld - Other Definitions: FHP_RPS_Flt, FUL_GenericInjSysFlt, EXM_EQR_ExhMnfdNotVld, INM_EGR_RateNotVld, ECT_Sensor_FA, ECT_Sensor_TFTKO, OAT_OAT_SnsrNonEmissFA, OAT_OAT_SensorTFTKO, OAT_PtEstFiltFA, IAT_SensorFA, IAT_SensorTFTKO, EXM_TurbFlowNotValid, AIC_AirShtOffReq, AIC_GenericBstSysFlt, AAP_AmbientAirPresDfltd, AAP_AmbPresSnsrTFTKO
Bundle Name: EXM_TurbFlowFA
EXM_TurbFlowFA - Other Definitions: FUL_GenericInjSysFlt, INM_CylTotFlowFA, EGR_VlvTotFlowFA
Bundle Name: EXM_TurbFlowNotValid
EXM_TurbFlowNotValid - Other Definitions: FUL_GenericInjSysFlt, INM_CylTotFlowNotValid, EGR_VlvTotFlowNotValid
Bundle Name: FAB_FuelPmpCktFA
P0231, P0232, P023F
Bundle Name: FAD_CB_CntrlType
FAD_CB_CntrlType - Other Definitions: Refer to "**CB Control Flag**" free form
Bundle Name: FAD_CB_Cyl_A_HiSaturated
FAD_CB_Cyl_A_HiSaturated - Other Definitions: If Combustion Mode == **KaFADC_b_CB_NormalCombMode** : CB Fuel Volume Correction applied on cylinder A > **KtFADC_V_CB_CntrlLim** Hysteresis on positive CB Fuel Volume Correction= 0.75 If Combustion Mode != **KaFADC_b_CB_NormalCombMode**: CB Fuel Volume Correction applied on cylinder A > **KtFADC_V_CB_CntrlLimRgnt** Hysteresis on positive CB Fuel Volume Correction= 0.75
Bundle Name: FAD_CB_Cyl_A_LoSaturated

FAD_CB_Cyl_A_LoSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder A <- **KtFADC_V_CB_CntrlLim**
Hysteresis on negative CB Fuel Volume Correction= 0.50

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder A < -**KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on negative CB Fuel Volume Correction= 0.50

Bundle Name: FAD_CB_Cyl_B_HiSaturated

FAD_CB_Cyl_B_HiSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder B > **KtFADC_V_CB_CntrlLim**
Hysteresis on positive CB Fuel Volume Correction= 0.75

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder B > **KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on positive CB Fuel Volume Correction= 0.75

Bundle Name: FAD_CB_Cyl_B_LoSaturated

FAD_CB_Cyl_B_LoSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder B <- **KtFADC_V_CB_CntrlLim**
Hysteresis on negative CB Fuel Volume Correction= 0.50

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder B < -**KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on negative CB Fuel Volume Correction= 0.50

Bundle Name: FAD_CB_Cyl_C_HiSaturated

FAD_CB_Cyl_C_HiSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder C > **KtFADC_V_CB_CntrlLim**
Hysteresis on positive CB Fuel Volume Correction= 0.75

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder C > **KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on positive CB Fuel Volume Correction= 0.75

Bundle Name: FAD_CB_Cyl_C_LoSaturated

FAD_CB_Cyl_C_LoSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder C <- **KtFADC_V_CB_CntrlLim**

Hysteresis on negative CB Fuel Volume Correction= 0.50

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder C < -**KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on negative CB Fuel Volume Correction= 0.50

Bundle Name: FAD_CB_Cyl_D_HiSaturated

FAD_CB_Cyl_D_HiSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder D > **KtFADC_V_CB_CntrlLim**
Hysteresis on positive CB Fuel Volume Correction= 0.75

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder D > **KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on positive CB Fuel Volume Correction= 0.75

Bundle Name: FAD_CB_Cyl_D_LoSaturated

FAD_CB_Cyl_D_LoSaturated - Other Definitions:
If Combustion Mode == **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder D <- **KtFADC_V_CB_CntrlLim**
Hysteresis on negative CB Fuel Volume Correction= 0.50

If Combustion Mode != **KaFADC_b_CB_NormalCombMode**:
CB Fuel Volume Correction applied on cylinder D < -**KtFADC_V_CB_CntrlLimRgnt**
Hysteresis on negative CB Fuel Volume Correction= 0.50

Bundle Name: FAD_CB_InjStkFlt

P029C, P02A0, P02A4, P02A8

Bundle Name: FAD_CB_MagnitudeChkFlt

FAD_CB_MagnitudeChkFlt - Other Definitions:
XOY_SecurityFlt

Bundle Name: FAD_CB_MaxAutShutOff

P0263, P0266, P0269, P0272

Bundle Name: FAD_CB_ShtOffReq

P029C, P02A0, P02A4, P02A8, P0263, P0266, P0269, P0272

FAD_CB_ShtOffReq - Other Definitions:
FUL_GenericInjSysFlt, FAD_CB_MagnitudeChkFlt, FAD_CWA_RngShtOffReq, FAD_EIA_RedntFlt, FHP_HighPresSysFlt,FHP_InjLeakage, Transmission Estimated Gear Validity, CrankSensor_TFTKO

Bundle Name: FAD_CWA_RngShtOffReq

FAD_CWA_RngShtOffReq - Other Definitions:
CrankSensor_TFTKO

Bundle Name: FAD_DFSA_EnblLrn

FAD_DFSA_EnblLrn - Other Definitions:
refer to "FSA Control Flag" Free Form

Bundle Name: FAD_DFSA_LrnShtOffReq

FAD_DFSA_LrnShtOffReq - Other Definitions:
EXM_TurbFlowNotValid, EGP_PresTurbDwnFlt, EGT_SnsrTurbDwnFlt

Bundle Name: FAD_EIA_DID_Written

FAD_EIA_DID_Written - Other Definitions:
Set to TRUE if all EIA (End of line Injector Adjustment) codes have been successfully programmed via DID (DIDs $60-$64).

Bundle Name: FAD_EIA_RedntFlt

FAD_EIA_RedntFlt - Other Definitions:
XOY_SecurityFlt

Bundle Name: FAD_FSA_EnblLrn

FAD_FSA_EnblLrn - Other Definitions:
refer to "FSA Control Flag" Free Form

Bundle Name: FAD_FSA_LrnShtOffReq

FAD_FSA_LrnShtOffReq - Other Definitions:
CrankSensor_TFTKO, (ECT_Sensor_FA AND ECT_Sensor_TFTKO), (IAT_SensorFAAND IAT_SensorTFTKO), FTS_FTS_CktFA, FTS_FTS_PlFA, AmbPresDfltdStatus,
FUL_GenericInjSysFlt, FAD_CB_InjStkFlt, FHP_InjLeakage ,
Transmission Gear Ratio Validity, (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO)

Bundle Name: FAD_FSA_NormRngCrtnValid

FAD_FSA_NormRngCrtnValid - Other Definitions:
refer to "FSA Control Flag" Free Form

Bundle Name: FAD_FSA_NormRngShtOffReq

FAD_FSA_NormRngShtOffReq - Other Definitions:
CrankSensor_TFTKO, (ECT_Sensor_FA AND ECT_Sensor_TFTKO), (IAT_SensorFA AND IAT_SensorTFTKO),
FTS_FTS_CktFA, FTS_FTS_PlFA, AmbPresDfltdStatus, FUL_GenericInjSysFlt

Bundle Name: FAD_SQA_InjMgntEnbld

FAD_SQA_InjMgntEnbld - Other Definitions:
Refer to "**SQA Control Flag**" free form

Bundle Name: FAD_SQA_LrnET_Enbl

FAD_SQA_LrnET_Enbl - Other Definitions:

FAD_SQA_InjMgntEnbld

Bundle Name: FAD_SQA_LrnPresEnbl

FAD_SQA_LrnPresEnbl - Other Definitions:
Refer to "**SQA Control Flag**" free form

Bundle Name: FAD_SQC_LrnShtOffReq

FAD_SQC_LrnShtOffReq - Other Definitions:
FAD_SQF_LrnShtOffReq, FTS_FTS_CktFA OR FTS_FTS_PlFA, FUL_InjLeakTempValid

Bundle Name: FAD_SQF_LrnShtOffReq

FAD_SQF_LrnShtOffReq - Other Definitions:
FAD_CWA_RngShtOffReq ,ClchPstnSnsrPerf FA, ClutchPstnSnsr FA, ClutchPstnSnsrCktLo FA, ClutchPstnSnsrNotLearned, ClutchPstnSnsrCktHi FA, CrankSensor_TFTKO, SWC_SwirlShtOffReq, EGR_PstnShtOffReq, TPS_PstnDvtnFA, FHP_InjLeakage, LPE_PstnShtOffReq, FourWheelDriveLowStateInvalid, FHP_HighPresSysFlt, FUL_GenericInjSysFlt,ECT_Sensor_TFTKO AND ECT_Sensor_FA, IAT_SensorFA AND IAT_SensorTFTKO , MnfdTempSensorTFTKO AND MnfdTempSensorFA, MAP_EngOffPressFA AND MAP_EngOffPressTFTKO, MAP_SensorFA AND MAP_SensorTFTKO, AmbPresDfltdStatus, Transmission Gear Ratio Validity

Bundle Name: FAD_XSQA_LrnCondEnbl

FAD_XSQA_LrnCondEnbl - Other Definitions:
Refer to "**SQA Control Flag**" free form

Bundle Name: FDB_FuelPresSnsrCktFA

P018C, P018D

Bundle Name: FHP_EngineShutdownReq

FHP_EngineShutdownReq - Other Definitions:
[FHP_PR_CtrlModeInhb AND (P0092 OR P0090 OR P0191 OR P0194
OR P0089 OR P0193 OR P0192 OR P228A OR FHP_V5B_OutOfRangeFlt)]
OR [FHP_MU_CtrlModeInhb AND (P2293 OR P228B)]

Bundle Name: FHP_FuelRailDischargeReq

FHP_FuelRailDischargeReq - Other Definitions:
[(**Pressure Control Configuration**= CeFHPG_e_MU_ModeSel)
OR
(**Pressure Control Configuration**= CeFHPG_e_MU_And_PR_ModeSel AND
FHP_MU_CtrlModeInhb= FALSE AND
FHP_PR_CtrlModeInhb= TRUE)]
AND
(ZeroTorq = TRUE AND
FHP_PresOfst= TRUE AND
Engine is not required to shut off AND
FUL_IFT_St= CeFULR_e_TstPhaseInit AND
At least one injection has been commanded since begin of driving cycle AND

FHP_ROD_InjActv= FALSE)
Bundle Name: FHP_HighPresSysFlt
FHP_HighPresSysFlt - Other Definitions: FHP_EngineShutdownReq OR FHP_RailPresRdctReq OR FHP_TorqRdctReq OR FHP_MU_CurrCktTFTKO
Bundle Name: FHP_InjLeakage
P0087, P228B, P228A
FHP_InjLeakage - Other Definitions:
Bundle Name: FHP_InjLeakageFA
P0087, P228B, P228A
Bundle Name: FHP_MU_CtrlModeInhb
P0191, P0192, P0193, P0194, P0089, P0090, P0091, P0092, P228A, P0089,
FHP_MU_CtrlModeInhb - Other Definitions: [P228D AND NOT(P229B)] OR **Metering Unit Valve present** = 0 OR FHP_V5B_OutOfRangeFlt
Bundle Name: FHP_MU_CurrCktTFTKO
P163A
Bundle Name: FHP_MU_DrvrCloseTFTKO
P0091
Bundle Name: FHP_MU_DrvrOpenTFTKO
P0090, P0092
Bundle Name: FHP_PR_CtrlModeInhb
P2293, P229B, P2294, P2295, P2296
FHP_PR_CtrlModeInhb - Other Definitions: [NOT(P228D) AND P229B] OR **Pressure Regulator Valve present** = 0
Bundle Name: FHP_PR_DrvrCloseTFTKO
P2295
Bundle Name: FHP_PR_DrvrOpenTFTKO
P2294, P2296
Bundle Name: FHP_PR_FuelTempLimEnbl
FHP_PR_FuelTempLimEnbl - Other Definitions: Rail pressure setpoint > **Rail Pressure limitation for Pressure Regulator**
Bundle Name: FHP_PresOfst
FHP_PresOfst - Other Definitions: Rail pressure setpoint - Rail pressure < 0 MPa AND

ABS(Rail pressure setpoint - Rail pressure) > 8.0 MPa for 20 * 6.25 ms
Bundle Name: FHP_PresStdySt
FHP_PresStdySt - Other Definitions: ABS(Rail pressure setpoint - Rail pressure) < 1.5 MPa for 65 * 6.25 ms
Bundle Name: FHP_RailPresRdctReq
P1297, P228C, P229A
FHP_RailPresRdctReq - Other Definitions: [FHP_PR_CtrlModeInhb AND (P2293 OR P228D OR P229B OR P0092 OR P0090 OR P000F OR P0088 OR P0089 OR P228B)] OR [FHP_MU_CtrlModeInhb AND (P228D OR P0092 OR P0090 OR P0191 OR P0194 OR P0089 OR P0193 OR P0192 OR P228A OR FHP_V5B_OutOfRangeFlt)]
Bundle Name: FHP_ROD_InjActv
FHP_ROD_InjActv - Other Definitions: False
Bundle Name: FHP_RPS_CktFA
P0192, P0193
Bundle Name: FHP_RPS_Flt
P0191, P0192, P0193, P0194
FHP_RPS_Flt - Other Definitions: FHP_V5B_OutOfRangeFlt
Bundle Name: FHP_SetPtLimByFuelTemp
FHP_SetPtLimByFuelTemp - Other Definitions: Rail pressure setpoint > **Rail Pressure Setpoint limitation**
Bundle Name: FHP_TorqRdctReq
P1297
FHP_TorqRdctReq - Other Definitions: [FHP_PR_CtrlModeInhb AND (P2293 OR P228D OR P229B OR P0092 OR P0090 OR P000F OR P0088 OR P0089 OR P228B)] OR [FHP_MU_CtrlModeInhb AND (P228D OR P229B OR P0092 OR P0090 OR P0191 OR P0194 OR P0089 OR P0193 OR P0192 OR FHP_V5B_OutOfRangeFlt OR P228A)]
Bundle Name: FHP_V5B_OutOfRangeFlt
FHP_V5B_OutOfRangeFlt - Other Definitions: 5VoltReferenceB_FA
Bundle Name: FOD_OutputDriver_FA
P0480, P0481, P0482, P0691, P0692, P0693, P0694, P0696, P1485, P1486, P1487
FOD_OutputDriver_FA - Other Definitions: P1485, P1486, P1487 EREV applications only
Bundle Name: FourWheelDriveLowStateInvalid
P2771

Bundle Name: FTS_FTS_CktFA
P0182, P0183
Bundle Name: FTS_FTS_Flt
FTS_FTS_Flt - Other Definitions: FTS_FTS_CktFA OR FTS_FTS_PlFA
Bundle Name: FTS_FTS_PlFA
P0181
Bundle Name: FTS_PlausRefSnsrFlt
FTS_PlausRefSnsrFlt - Other Definitions: ECT_Sensor_FA if **P0181 Fuel Temperature Sensor Reference** is equal to CeFTSR_e_ECT_Snsr; IAT_SensorFA if **P0181 Fuel Temperature Sensor Reference** is equal to CeFTSR_e_IAT_Snsr; MnfdTempSensorFA if **P0181 Fuel Temperature Sensor Reference** is equal to CeFTSR_e_IAT_2_Snsr; EGT_SnsrDPF_UpFA if **P0181 Fuel Temperature Sensor Reference** is equal to CeFTSR_e_MainCatTempSnsr.
Bundle Name: FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068
FuelLevelDataFault - Other Definitions: AccCktLo_FA
Bundle Name: FUL_A_Released
FUL_A_Released - Other Definitions: This control flag is true if at least one AFTER injection is programmed
Bundle Name: FUL_BoostVoltTFTKO
P062D
Bundle Name: FUL_CntrlrStTFTKO
P062B
Bundle Name: FUL_CylDisable_CiEPSR_CylinderA
FUL_CylDisable_CiEPSR_CylinderA - Other Definitions: **For both 4 and 8 Cylinder Engines:** Injector 1 disabled by CPID $18 (AE 18 80 80) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylDisable_CiEPSR_CylinderB
FUL_CylDisable_CiEPSR_CylinderB - Other Definitions: **For 4 Cylinder Engines:** Injector 3 disabled by CPID $18 (AE 18 80 40) (Injector Disable Test strategy only active at Service) **For 8 Cylinder Engines:** Injector 2 disabled by CPID $18 (AE 18 80 40) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylDisable_CiEPSR_CylinderC
FUL_CylDisable_CiEPSR_CylinderC - Other Definitions: **For 4 Cylinder Engines:** Injector 4 disabled by CPID $18 (AE 18 80 20) (Injector Disable Test strategy only active at Service) **For 8 Cylinder Engines:** Injector 7 disabled by CPID $18 (AE 18 80 20) (Injector Disable Test strategy only active at Service)

Bundle Name: FUL_CylDisable_CiEPSR_CylinderD
FUL_CylDisable_CiEPSR_CylinderD - Other Definitions: **For 4 Cylinder Engines:** Injector 2 disabled by CPID $18 (AE 18 80 10) (Injector Disable Test strategy only active at Service) **For 8 Cylinder Engines:** Injector 8 disabled by CPID $18 (AE 18 80 10) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylDisable_CiEPSR_CylinderE
FUL_CylDisable_CiEPSR_CylinderE - Other Definitions: Injector 4 disabled by CPID $18 (AE 18 80 08) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylDisable_CiEPSR_CylinderF
FUL_CylDisable_CiEPSR_CylinderF - Other Definitions: Injector 5 disabled by CPID $18 (AE 18 80 04) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylDisable_CiEPSR_CylinderG
FUL_CylDisable_CiEPSR_CylinderG - Other Definitions: Injector 6 disabled by CPID $18 (AE 18 80 02) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylDisable_CiEPSR_CylinderH
FUL_CylDisable_CiEPSR_CylinderH - Other Definitions: Injector 3 disabled by CPID $18 (AE 18 80 01) (Injector Disable Test strategy only active at Service)
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderA
For both 4 and 8 Cylinder Engines: P2147, P2148, P0261, P0262, P0201, P1248, P0271, P0270
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderB
For 4 Cylinder Engines: P2150, P2151, P0267, P0268, P0203, P124A, P0264, P0265 For 8 Cylinder Engines: P2150, P2151, P0273, P0274, P0202, P1249, P0264, P0265
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderC
For 4 Cylinder Engines: P2147, P2148, P0270, P0271, P0204, P124B, P0261, P0262 For 8 Cylinder Engines: P2153, P2154, P0279, P0280, P0207, P124E, P0276, P0277
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderD
For 4 Cylinder Engines: P2150, P2151, P0264, P0265, P0202, P1249, P0267, P0268 For 8 Cylinder Engines: P2156, P2157, P0282, P0283, P0208, P124F, P0267, P0268
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderE
P2147, P2148, P0270, P0271, P0204, P124B, P0261, P0262
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderF
P2150, P2151, P0273, P0274, P0205, P124C, P0264, P0265
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderG
P2153, P2154, P0276, P0277, P0206, P124D, P0279, P0280
Bundle Name: FUL_CylInjCktTFTKO_CiEPSR_CylinderH
P2156, P2157, P0267, P0268, P0203, P124A, P0282, P0283

Bundle Name: FUL_FuelInjected
FUL_FuelInjected - Other Definitions: At least one Injection Pulse is requested by the application software (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderA
FUL_FuelInjectedCyl_CiEPSR_CylinderA - Other Definitions: **For both 4 and 8 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 1 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderB
FUL_FuelInjectedCyl_CiEPSR_CylinderB - Other Definitions: **For 4 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 3 (engine running and no cut off active) **For 8 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 2 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderC
FUL_FuelInjectedCyl_CiEPSR_CylinderC - Other Definitions: **For 4 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 4 (engine running and no cut off active) **For 8 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 7 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderD
FUL_FuelInjectedCyl_CiEPSR_CylinderD - Other Definitions: **For 4 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 2 (engine running and no cut off active) **For 8 Cylinder Engines:** At least one Injection Pulse is requested by the application software for the cylinder 8 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderE
FUL_FuelInjectedCyl_CiEPSR_CylinderE - Other Definitions: At least one Injection Pulse is requested by the application software for the cylinder 4 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderF
FUL_FuelInjectedCyl_CiEPSR_CylinderF - Other Definitions: At least one Injection Pulse is requested by the application software for the cylinder 5 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderG
FUL_FuelInjectedCyl_CiEPSR_CylinderG - Other Definitions: At least one Injection Pulse is requested by the application software for the cylinder 6 (engine running and no cut off active)
Bundle Name: FUL_FuelInjectedCyl_CiEPSR_CylinderH
FUL_FuelInjectedCyl_CiEPSR_CylinderH - Other Definitions: At least one Injection Pulse is requested by the application software for the cylinder 3 (engine running and no cut off active)
Bundle Name: FUL_GenericInjSysFA
P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277,

P0279, P0280, P0282, P0283, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F,
P020A, P020B, P020C, P020D, P020E, P020F, P021A, P021B, P0216, P126A, P02EE, P02EF, P02F0, P02F1, P02F2, P02F3, P02F4, P02F5, P062B, P062D,

Bundle Name: FUL_GenericInjSysFlt

P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277,
P0279, P0280, P0282, P0283, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F,
P020A, P020B, P020C, P020D, P020E, P020F, P021A, P021B, P0216, P126A, P02EE, P02EF, P02F0, P02F1, P02F2, P02F3, P02F4, P02F5, P062B, P062D,

Bundle Name: FUL_IFT_St

FUL_IFT_St - Other Definitions:
This interface assumes the value **CeFULR_e_TstPhaseInit.**

Bundle Name: FUL_InjCktTFTKO

P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277,
P0279, P0280, P0282, P0283, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F,

Bundle Name: FUL_InjectorDisable

FUL_InjectorDisable - Other Definitions:
device control active (AE 18 80 XX)
AND
XX refers to a valid cylinder (1 - 4)
AND
IFT not active (FUL_IFT_St == CeFULR_e_TstPhaseInit)
AND
device control timer > 0 sec

When the test is in progress, the injector is disabled for a fixed time (about 30s). The device control timer starts from this fixed time and it is decreased up to 0 s.

Bundle Name: FUL_InjLeakInitNotValid

FUL_InjLeakInitNotValid - Other Definitions:
This flag is TRUE when the following conditions are verified in AND:

engine synchronized, i.e.
(GetEPSR_e_EngSyncState() == CeEPSR_EngineSync) ||
(GetEPSR_e_EngSyncState() == CeEPSR_BackupSync) || (GetEPSR_e_EngSyncState()
== CeEPSR_e_VerifySync)

AND

(IAT_SensorTFTKO || EngineModeNotRunTimerError)

Bundle Name: FUL_InjLeakTempValid

FUL_InjLeakTempValid - Other Definitions:

NOT(FUL_InjLeakInitNotValid OR ECT_Sensor_FA OR FTS_FTS_CktFA OR FTS_FTS_PlFA OR XOY_SecurityFlt_CeXOYR_e_FULR_FTD_RateLimFlt OR XOY_SecurityFlt_CeXOYR_e_ETMR_FTD_RedntCalcFlt)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderA

FUL_OutEnblCyl_CiEPSR_CylinderA - Other Definitions:
For both 4 and 8 Cylinder Engines: 0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderA ||FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl1InjTmng ||FUL_CylDisable_CiEPSR_CylinderA || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderB

FUL_OutEnblCyl_CiEPSR_CylinderB - Other Definitions:
For 4 Cylinder Engines: 0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderB || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl3InjTmng || FUL_CylDisable_CiEPSR_CylinderB || (Injection controller status reported by HWIO ~= READY)
For 8 Cylinder Engines: 0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderB || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl2InjTmng || FUL_CylDisable_CiEPSR_CylinderB || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderC

FUL_OutEnblCyl_CiEPSR_CylinderC - Other Definitions:
For 4 Cylinder Engines: 0.00 ||FUL_CylInjCktTFTKO_CiEPSR_CylinderC || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl4InjTmng || FUL_CylDisable_CiEPSR_CylinderC || (Injection controller status reported by HWIO ~= READY)
For 8 Cylinder Engines: 0.00 ||FUL_CylInjCktTFTKO_CiEPSR_CylinderC ||FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl7InjTmng || FUL_CylDisable_CiEPSR_CylinderC || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderD

FUL_OutEnblCyl_CiEPSR_CylinderD - Other Definitions:
For 4 Cylinder Engines: 0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderD || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl2InjTmng || FUL_CylDisable_CiEPSR_CylinderD || (Injection controller status reported by HWIO ~= READY)
For 8 Cylinder Engines: 0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderD || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl8InjTmng || FUL_CylDisable_CiEPSR_CylinderD || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderE

FUL_OutEnblCyl_CiEPSR_CylinderE - Other Definitions:
0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderE || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl4InjTmng || FUL_CylDisable_CiEPSR_CylinderE || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderF

FUL_OutEnblCyl_CiEPSR_CylinderF - Other Definitions:
0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderF || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl5InjTmng || FUL_CylDisable_CiEPSR_CylinderF || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderG

FUL_OutEnblCyl_CiEPSR_CylinderG - Other Definitions:
0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderG || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl6InjTmng || FUL_CylDisable_CiEPSR_CylinderG || (Injection controller status reported by HWIO ~= READY)

Bundle Name: FUL_OutEnblCyl_CiEPSR_CylinderH
FUL_OutEnblCyl_CiEPSR_CylinderH - Other Definitions: 0.00 || FUL_CylInjCktTFTKO_CiEPSR_CylinderH || FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl3InjTmng || FUL_CylDisable_CiEPSR_CylinderH || (Injection controller status reported by HWIO ~= READY)
Bundle Name: FUL_PostEnbl
FUL_PostEnbl - Other Definitions: Refer to the free form FULPostEnbl
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl1InjTmng
P020A
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl2InjTmng
P020B
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl3InjTmng
P020C
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl4InjTmng
P020D
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl5InjTmng
P020E
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl6InjTmng
P020F
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl7InjTmng
P021A
Bundle Name: FUL_PullInCylErrTFTKO_CeDFIR_e_Cyl8InjTmng
P021B
Bundle Name: FUL_PullInErrTFTKO
P020A, P020B, P020C, P020D, P020E, P020F, P021A, P021B
Bundle Name: HCB_ActrDiagShtOff
P0033, P0034, P0035
Bundle Name: HCB_ActrDiagShtOffFA
P0033, P0034, P0035
Bundle Name: HCI_DeHC_BasicReq
HCI_DeHC_BasicReq - Other Definitions: Boolean flag indicating that DeHC is needed due to high HC storage in exhaust devices or due to not completed DeHC event.
Bundle Name: HCI_DeHC_ExhInjDsbl
HCI_DeHC_ExhInjDsbl - Other Definitions: GetHCIR_b_DeHC_ExhInjDsbl =1 means that the actuators used to inject HC in the exhaust line (Post Injection and HC Injector) shall be disabled.

GetHCIR_b_DeHC_ExhInjDsbl = 1 if one of those two sets of conditions is satisfied:
- Combustion Mode equal to one of allowed modes (DPF), aftertreatment HC storage based request of DeHC, HCI_DeHC_BasicReq = 1 and none among EXM_PM_TurbFlowNotVld (Exhaust Mass Flow Fault Flag),EXM_O2_ExhMnfdNotValid (O2 Exhaust Manifold Concentration Fault Flag) and EXM_HC_TurbFlowNotValid(HC Exhaust Manifold Mass Flow Fault Flag) = 1.
- Generic DeHC Park or DeHC Drive request is = 1, none of EXM_TurbFlowNotValid,EXM_O2_ExhMnfdNotValid and EXM_HC_TurbFlowNotValid= 1 and no DeHC deactivation request for time or over temperature is present.

Bundle Name: HCI_GenericShtOffReq

P20CB, P20CD, P20CE, P2670

HCI_GenericShtOffReq - Other Definitions:

Bundle Name: HCI_HC_dm_Cat2_UpFlt

HCI_HC_dm_Cat2_UpFlt - Other Definitions:
EPM_HC_dm_Pipe4_DwnFlt

Bundle Name: HCI_HC_dm_CatUpFlt

HCI_HC_dm_CatUpFlt - Other Definitions:
EXM_TurbFlowNotValid

Bundle Name: HCI_HC_dm_DPF_UpFlt

HCI_HC_dm_DPF_UpFlt - Other Definitions:
CAT_HC_Cat2_DwnFlt

Bundle Name: HCI_HC_dm_SCR_UpFlt

HCI_HC_dm_SCR_UpFlt - Other Definitions:
EPM_HC_dm_Pipe2_DwnFlt

Bundle Name: HCI_HCI_CntrlEnbl

HCI_HCI_CntrlEnbl - Other Definitions:
GetHCIR_b_HCI_CntrlEnbl =1 when the control of HC Injector for regeneration purposes is enabled. GetHCIR_b_HCI_CntrlEnbl = 1 if:
- Combustion Mode equal to one of allowed modes (DPF)
- HCI_GenericShtOffReq = 0
- EXC_HCI_Enbl = 1
- HCI_DeHC_ExhInjDsbl = 0
- Sensor DPF Up Temperature is higher than 320.00 (with hysteresis threshold 300.00) and EGT_SnsrDPF_UpFlt = 0 or EGT_SnsrDPF_UpFlt =1 and modelled DPF Up Temperature respects the same thresholds mentioned before.
- modelled DOC 2 Up Temperature is higher than 320.00 (with hysteresis threshold 300.00) or EGT_TempCat2_UpFlt = 1
- PT Relè Voltage is in the range between 100,000.00 (with hysteresis threshold 100,000.00) and 0.00 (with hysteresis threshold 0.00)
- Differential Pressure Across HC Injector is higher than 320.00 (with hysteresis threshold 300.00) or EGP_PresHCI_UpFlt= 1
- Estimated Exhaust Mass Flow Upstream HC Injector (low pass filtered with 1.00 constant) is higher than 5.00 (with hysteresis threshold 4.50) and EXF_TotExhHC_InjUpFlt = 0

Bundle Name: HCI_HCI_RelRgn

HCI_HCI_RelRgn - Other Definitions:

GetHCIR_b_HCI_RelRgn = 1 when the low level logic of HC Injector for Regeneration purpose is enabled that means if: - HCI_HCI_CntrlEnbl= 1 - Requested HC Injector Quantity is higher than 2.00 (with hysteresis threshold 1.00)
Bundle Name: HCI_InjReleaseSt
HCI_InjReleaseSt - Other Definitions: GetHCIR_b_InjReleaseSt = 1 if: - if HCI_HCI_RelRgn = 1 - if the current 100 ms task allows the injection, according to injection frequency - if the requested HC quantity (equal to the currently requested quantity plus the integral of the quantity requested but not yet released) is greater than minimum quantity per task 60.00
Bundle Name: HCI_O2_HCI_DwnFlt
HCI_O2_HCI_DwnFlt - Other Definitions: OXY_O2_HCI_UpFlt
Bundle Name: HCI_TotExh_dm_HCI_DwnFA
HCI_TotExh_dm_HCI_DwnFA - Other Definitions: EXF_TotExhHC_InjUpFA
Bundle Name: HCI_TotExh_dm_HCI_DwnFlt
HCI_TotExh_dm_HCI_DwnFlt - Other Definitions: EXF_TotExhHC_InjUpFlt
Bundle Name: HTB_ActrDiagShtOff
P22CF, P22D0, P22D1
Bundle Name: HTB_ActrDiagShtOffFA
P22CF, P22D0, P22D1
Bundle Name: HumidityFA
P0097, P0098, P00F4, P00F5, P2227, P2228, P2229, P2230
Bundle Name: HumidityTFTKO
P0097, P0098, P00F4, P00F5, P2227, P2228, P2229, P2230
Bundle Name: HumTempSnsrCktFA
P0097, P0098
Bundle Name: HumTempSnsrFA
P0096, P0097, P0098, P0099
Bundle Name: HumTempSnsrTFTKO
P0096, P0097, P0098, P0099
Bundle Name: IAT_SensorCircuitFA
P0112, P0113
Bundle Name: IAT_SensorFA
P0111, P0112, P0113, P0114

Bundle Name: IAT_SensorTFTKO
P0111, P0112, P0113, P0114
Bundle Name: INM_ComprAirFlowNotVld
INM_ComprAirFlowNotVld - Other Definitions: MAF_MAF_SnsrFA, MAF_MAF_SnsrTFTKO, LPE_VlvAirFlowNotVld
Bundle Name: INM_CylAirFlowNotValid
INM_CylAirFlowNotValid - Other Definitions: INM_CylTotFlowNotValid, INM_O2_IntkMnfdNotValid
Bundle Name: INM_CylTotFlowFA
INM_CylTotFlowFA - Other Definitions: INM_IntkGapFA, EGR_PstnSnsrFA, LPE_PstnSnsrFA
Bundle Name: INM_CylTotFlowNomFA
INM_CylTotFlowNomFA - Other Definitions: MAP_SensorFA, MAP_EngOffPressFA, MnfdTempSensorFA, ECT_Sensor_FA, SWC_SwirlShtOffReq, FUL_GenericInjSysFA
Bundle Name: INM_CylTotFlowNomNotVld
INM_CylTotFlowNomNotVld - Other Definitions: MAP_SensorFA, MAP_EngOffPressFA, MAP_SensorTFTKO, MAP_EngOffPressTFTKO, MnfdTempSensorFA, MnfdTempSensorTFTKO, ECT_Sensor_FA, ECT_Sensor_TFTKO, SWC_SwirlShtOffReq, FUL_GenericInjSysFlt
Bundle Name: INM_CylTotFlowNotValid
INM_CylTotFlowNotValid - Other Definitions: INM_IntkGapNotValid, EGR_PstnSnsrFlt, LPE_PstnSnsrFlt
Bundle Name: INM_EGR_RateNotVld
INM_EGR_RateNotVld - Other Definitions: INM_EGR_RateNotVld, LPE_VlvTotFlowNotVld, EGR_VlvTotFlowNotValid
Bundle Name: INM_IntkGapFA
INM_IntkGapFA - Other Definitions: MAF_MAF_SnsrFA, INM_CylTotFlowNomFA, LPE_VlvTotFlowNomFA
Bundle Name: INM_IntkGapNotValid
INM_IntkGapNotValid - Other Definitions: MAF_MAF_SnsrFA, MAF_MAF_SnsrTFTKO, INM_CylTotFlowNomNotVld, LPE_VlvTotFlowNomNotVld
Bundle Name: INM_O2_IntkMnfdNotValid

INM_O2_IntkMnfdNotValid - Other Definitions: INM_CylTotFlowNotValid, EGR_VlvTotFlowNotValid, INM_ThrotAirFlowNotVld
Bundle Name: INM_ThrotAirFlowNotVld
INM_ThrotAirFlowNotVld - Other Definitions: INM_ComprAirFlowNotVld
Bundle Name: LowFuelConditionDiagnostic
LowFuelConditionDiagnostic - Other Definitions: Flag set to TRUE if the fuel level < 10.0 % AND No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds
Bundle Name: LPE_PstnShtOffReq
P044C, P044D, P045A, P045C, P045E, P045F, P045D, P049E, P1419, P141A, P141B, P141C
LPE_PstnShtOffReq - Other Definitions:
Bundle Name: LPE_PstnSnsrFA
P044C, P044D, P049E
LPE_PstnSnsrFA - Other Definitions:
Bundle Name: LPE_PstnSnsrFlt
P044C, P044D, P049E
LPE_PstnSnsrFlt - Other Definitions:
Bundle Name: LPE_TempSnsrFA
P141D, P141E, P141F
LPE_TempSnsrFA - Other Definitions:
Bundle Name: LPE_TempSnsrTFTKO
P141D, P141E, P141F
LPE_TempSnsrTFTKO - Other Definitions:
Bundle Name: LPE_VlvAirFlowNotVld
LPE_VlvAirFlowNotVld - Other Definitions: LPE_VlvTotFlowNotVld, EXM_O2_ExhMnfdNotValid
Bundle Name: LPE_VlvDwnPresNotVld
LPE_VlvDwnPresNotVld - Other Definitions: MAF_MAF_SnsrFA, MAF_MAF_SnsrTFTKO, IAT_SensorFA, IAT_SensorTFTKO, LPE_PstnSnsrFlt, AAP_AmbientAirPresDfltd, AAP_AmbPresSnsrTFTKO

Bundle Name: LPE_VlvOvrHtTFTKO
P241F
LPE_VlvOvrHtTFTKO - Other Definitions:
Bundle Name: LPE_VlvTotFlowNomFA
LPE_VlvTotFlowNomFA - Other Definitions: EGT_SnsrDPF_UpFA, AAP_AmbientAirPresDfltd, IAT_SensorFA, LPE_TempSnsrFA
Bundle Name: LPE_VlvTotFlowNomNotVld
LPE_VlvTotFlowNomNotVld - Other Definitions: LPE_PstnSnsrFlt, LPE_VlvDwnPresNotVld, LPE_TempSnsrFA, LPE_TempSnsrTFTKO, EGP_PresLPE_UpFlt
Bundle Name: LPE_VlvTotFlowNotVld
LPE_VlvTotFlowNotVld - Other Definitions: LPE_PstnSnsrFlt, EGR_PstnSnsrFlt, LPE_VlvTotFlowNomNotVld, INM_IntkGapNotValid
Bundle Name: MAF_AirFlowEstdSS_NotVld
MAF_AirFlowEstdSS_NotVld - Other Definitions: MAP_SensorFA, MAP_SensorTFTKO, MAP_EngOffPressFA, MAP_EngOffPressTFTKO, MnfdTempSensorFA, MnfdTempSensorTFTKO, ECT_Sensor_FA, ECT_Sensor_TFTKO, SWC_SwirlShtOffReq, FUL_GenericInjSysFlt
Bundle Name: MAF_MAF_SnsrCktFlt
P0102, P0103
Bundle Name: MAF_MAF_SnsrCktOffstFA
P0100, P0102, P0103
Bundle Name: MAF_MAF_SnsrCktOffstTFKO
P0100, P0102, P0103
Bundle Name: MAF_MAF_SnsrFA
P0100, P0101, P0102, P0103
Bundle Name: MAF_MAF_SnsrOfstFA
P0100
Bundle Name: MAF_MAF_SnsrOfstTFTKO
P0100
Bundle Name: MAF_MAF_SnsrPerfFA
P0101
Bundle Name: MAF_MAF_SnsrPerfTFTKO
P0101
Bundle Name: MAF_MAF_SnsrTFTKO
P0100, P0101, P0102, P0103

Bundle Name: MAF_SensorFA
P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAF_SensorTFTKO
P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAP_EngOffPressFA
P00C7
Bundle Name: MAP_EngOffPressTFTKO
P00C7
Bundle Name: MAP_SensorCircuitFA
P0107, P0108
Bundle Name: MAP_SensorCircuitFP
P0107, P0108
Bundle Name: MAP_SensorFA
P0106, P0107, P0108
Bundle Name: MAP_SensorTFTKO
P0106, P0107, P0108
Bundle Name: MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P00EA, P00EB. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P00E9, P00EA, P00EB, P00EC. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: MnfdTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P00E9, P00EA, P00EB, P00EC. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ModuleOffTimeErr
P262B
Bundle Name: NOX_NOx_ppm_Cat2_UpFlt
NOX_NOx_ppm_Cat2_UpFlt - Other Definitions: CC-DOC_UF-SCR_UF-DOC.DPF: EPM_NOx_ppm_Pipe4_DwnFlt
Bundle Name: NOX_NOx_ppm_DPF_UpFlt
NOX_NOx_ppm_DPF_UpFlt - Other Definitions: CC-DOC.DPF_UF-SCR: CAT_NOx_ppm_CatDwnFlt CC-DOC_UF-SCR_UF-DOC.DPF: CAT_NOx_ppm_Cat2_DwnFlt
Bundle Name: NOX_NOx_Rat_Cat2_UpFlt
NOX_NOx_Rat_Cat2_UpFlt - Other Definitions: EPM_NOx_Rat_Pipe4_DwnFlt
Bundle Name: NOX_NOx_Rat_CatUpFlt

NOX_NOx_Rat_CatUpFlt - Other Definitions: EXM_NO2_NOx_ExhMnfdNotVld
Bundle Name: NOX_NOx_Rat_DPF_UpFlt
NOX_NOx_Rat_DPF_UpFlt - Other Definitions: CC-DOC.DPF_UF-SCR: CAT_NOx_Rat_CatDwnFlt   CC-DOC_UF-SCR_UF-DOC.DPF: CAT_NOx_Rat_Cat2_DwnFlt
Bundle Name: NOX_NOx_Rat_SCR_UpFlt
NOX_NOx_Rat_SCR_UpFlt - Other Definitions: EPM_NOx_Rat_Pipe2_DwnFlt
Bundle Name: NOX_NOx_SnsrCatUpFlt
NOX_NOx_SnsrCatUpFlt - Other Definitions: NOX_Snsr1_NOx_Flt
Bundle Name: NOX_NOx_SnsrSCR_DwnFlt
U029E,
NOX_NOx_SnsrSCR_DwnFlt - Other Definitions: NOX_Snsr2_NOx_Flt
Bundle Name: NOX_NOx1_DecrDynChkFlt
P22FA
NOX_NOx1_DecrDynChkFlt - Other Definitions:
Bundle Name: NOX_NOx1_DynChkFlt
P22FA, P22F9
Bundle Name: NOX_NOx1_IncrDynChkFlt
P22F9
Bundle Name: NOX_NOx1_NOxPlausFlt
P11CC
Bundle Name: NOX_NOx1_OfstMontrFlt
P11D3
Bundle Name: NOX_NOx1_OutOfRngHiFlt
P2203
Bundle Name: NOX_NOx1_OutOfRngLoFlt
P2202
Bundle Name: NOX_NOx1_StBitChkFlt
P11DB
Bundle Name: NOX_NOx2_DynChkFlt
P229F

Bundle Name: NOX_NOx2_OfstMontrFlt
P11D5
Bundle Name: NOX_NOx2_OutOfRngHiFlt
P22A1
Bundle Name: NOX_NOx2_OutOfRngLoFlt
P22A0
Bundle Name: NOX_NOx2_SelfDiagFlt
P22FE
Bundle Name: NOX_NOx2_StBitChkFlt
P11DC
Bundle Name: NOX_NOx2SelfDiagFlt
P22FE
Bundle Name: NOX_Snsr1_ElecFA
P2205, P2209, P11DD, P2200, P220A, P115E, P115F, P1160, P116A, P116B, P116C, P116D, P116E, P116F, P1192, P1193, P1194, P2205, P2206, P2207, P2208, P2210, P2211, P11C5, P11C6, P119A, P119B, P119C
Bundle Name: NOX_Snsr1_FA
P11CC, U029D
NOX_Snsr1_FA - Other Definitions: NOX_Snsr1_ElecFA
Bundle Name: NOX_Snsr1_FltSt
P2205, P2209, P11DD, P2200, P220A, P115E, P115F, P1160, P116A, P116B, P116C, P116D, P116E, P116F, P1192, P1193, P1194, P2205, P2206, P2207, P2208, P2210, P2211, P11C5, P11C6, P119A, P119B, P119C
Bundle Name: NOX_Snsr1_NotVld
U029D
NOX_Snsr1_NotVld - Other Definitions: NOX_Snsr1_FltSt, NOX_NOx1_StBitChkFlt,
Bundle Name: NOX_Snsr1_NOx_Flt
NOX_Snsr1_NOx_Flt - Other Definitions: NOX_Snsr1_NotVld, NOX_NOx1_NOxPlausFlt,NOX_NOx2_OutOfRngLoFlt,NOX_NOx2_OutOfRngHiFlt, NOX_NOx1_DecrDynChkFlt, NOX_NOx1_IncrDynChkFlt
Bundle Name: NOX_Snsr1_O2_NotRlb
NOX_Snsr1_O2_NotRlb - Other Definitions: NOx Sensor 1 supply in range > 10,8V NOx Sensor 1 dewpoint is reached = TRUE - 0.03 < (sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence < + 0.03 Stability flag for NOx/Lambda = TRUE
Bundle Name: NOX_Snsr1_PresFlt
NOX_Snsr1_PresFlt - Other Definitions:

EGP_PresCatUpFlt

Bundle Name: NOX_Snsr1_TempFlt

NOX_Snsr1_TempFlt - Other Definitions:
CC-DOC.DPF_UF-SCR: EGT_SnsrTurbDwnFlt CC-DOC_UF-SCR_UF-DOC.DPF: EGT_SnsrTurbDwnFlt

Bundle Name: NOX_Snsr2_ElecFA

P22A3, P22A7, P11DE, P229E, P220B, P11BE, P11BF, P11C0, P11D0, P11D1, P11D2, P11D8, P11D9, P11DA, P11FC, P11FD, P11FE, P22A3, P22A4, P22A5, P22A6, P22A8, P22A9, P11C7, P11C8, P119D, P119E, P119F

Bundle Name: NOX_Snsr2_FltSt

P22A3, P22A7, P11DE, P229E, P220B, P11BE, P11BF, P11C0, P11D0, P11D1, P11D2, P11D8, P11D9, P11DA, P11FC, P11FD, P11FE, P22A3, P22A4, P22A5, P22A6, P22A8, P22A9, P11C7, P11C8, P119D, P119E, P119F

Bundle Name: NOX_Snsr2_NotVld

U029E

NOX_Snsr2_NotVld - Other Definitions:
NOX_Snsr2_FltSt, NOX_NOx2_StBitChkFlt,

Bundle Name: NOX_Snsr2_NOx_Flt

NOX_Snsr2_NOx_Flt - Other Definitions:
NOX_Snsr2_NotVld, NOX_NOx2_DynChkFlt, NOX_NOx2_OutOfRngLoFlt, NOX_NOx2_OutOfRngHiFlt, NOX_NOx2SelfDiagFlt

Bundle Name: NOX_Snsr2_O2_NotRlb

NOX_Snsr2_O2_NotRlb - Other Definitions:
NOx Sensor 2 supply in range > 10,8V
Nox Sensor 2 dewpoint is reached = TRUE
- 0.03 < (sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence < + 0.03
Stability flag for NOx/Lambda = TRUE

Bundle Name: NOX_Snsr2_PresFlt

NOX_Snsr2_PresFlt - Other Definitions:
EGP_PresSCR_DwnFlt

Bundle Name: NOX_Snsr2_TempFlt

NOX_Snsr2_TempFlt - Other Definitions:
CC-DOC.DPF_UF-SCR: EGT_TempSCR_DwnFlt   CC-DOC_UF-SCR_UF-DOC.DPF: EGT_TempSCR_DwnFlt

Bundle Name: OAT_OAT_SensorTFTKO

P0071, P0072, P0073, P0074

Bundle Name: OAT_OAT_SnsrNonEmissFA

P0070, P0071

Bundle Name: OAT_PtEstFiltFA

ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: VehicleSpeedSensor_FA, IAT_SensorFA, MAF_SensorFA. All other cases:

EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected.

Bundle Name: OAT_PtEstRawFA

ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: IAT_SensorFA. All other cases: IAT_SensorFA, ECT_Sensor_DefaultDetected.

Bundle Name: OXY_eqr_TurbDwn_FSA_NotVld

OXY_eqr_TurbDwn_FSA_NotVld - Other Definitions:
OXY_NOx1_eqr_FSA_NotVld

Bundle Name: OXY_eqr_TurbDwnNotRlb

OXY_eqr_TurbDwnNotRlb - Other Definitions:
OXY_NOx1_O2_RawNotRlb

Bundle Name: OXY_eqr_TurbDwnNotVld

OXY_eqr_TurbDwnNotVld - Other Definitions:
OXY_NOx1_EQR_NotVld

Bundle Name: OXY_NOx1_eqr_FSA_NotVld

OXY_NOx1_eqr_FSA_NotVld - Other Definitions:
NOX_Snsr1_NotVld, NOX_Snsr1_PresFlt, OXY_NOx1SignRngMinTFTKO, OXY_NOx1SignRngMaxTFTKO, OXY_NOx1ChkOvrrnTFTKO, OXY_NOx1DecrDynTFTKO, OXY_NOx1IncrDynTFTKO

Bundle Name: OXY_NOx1_EQR_NotVld

OXY_NOx1_EQR_NotVld - Other Definitions:
NOX_Snsr1_NotVld, NOX_Snsr1_PresFlt, OXY_NOx1SignRngMinTFTKO, OXY_NOx1SignRngMaxTFTKO, OXY_NOx1ChkOvrrnTFTKO, OXY_NOx1ChkLoadTFTKO, OXY_NOx1DecrDynTFTKO, OXY_NOx1IncrDynTFTKO

Bundle Name: OXY_NOx1_O2_Flt

OXY_NOx1_O2_Flt - Other Definitions:
NOX_Snsr1_NotVld, NOX_Snsr1_PresFlt, OXY_NOx1SignRngMinFlt, OXY_NOx1SignRngMaxFlt, OXY_NOx1ChkOvrrnFlt, OXY_NOx1ChkLoadFlt, OXY_NOx1DecrDynFlt, OXY_NOx1IncrDynFlt

Bundle Name: OXY_NOx1_O2_RawNotRlb

OXY_NOx1_O2_RawNotRlb - Other Definitions:
NOX_Snsr1_O2_NotRlb

Bundle Name: OXY_NOx1ChkLoadFlt

P2A00

Bundle Name: OXY_NOx1ChkLoadTFTKO

P2A00

Bundle Name: OXY_NOx1ChkOvrrnFlt

P2297
Bundle Name: OXY_NOx1ChkOvrrnTFTKO
P2297
Bundle Name: OXY_NOx1DecrDynFlt
P014D
Bundle Name: OXY_NOx1DecrDynTFTKO
P014D
Bundle Name: OXY_NOx1IncrDynFlt
P014C
Bundle Name: OXY_NOx1IncrDynTFTKO
P014C
Bundle Name: OXY_NOx1SignRngChkFlt
OXY_NOx1SignRngChkFlt - Other Definitions: OXY_NOx1SignRngMaxFlt, OXY_NOx1SignRngMinFlt
Bundle Name: OXY_NOx1SignRngMaxFlt
P2628
Bundle Name: OXY_NOx1SignRngMaxTFTKO
P2628
Bundle Name: OXY_NOx1SignRngMinFlt
P2627
Bundle Name: OXY_NOx1SignRngMinTFTKO
P2627
Bundle Name: OXY_NOx2_O2_Flt
OXY_NOx2_O2_Flt - Other Definitions: NOX_Snsr2_NotVld, NOX_Snsr2_PresFlt, OXY_NOx2SignRngChkFlt, OXY_NOx2ChkFlt, OXY_NOx2DecrDynFlt, OXY_NOx2IncrDynFlt
Bundle Name: OXY_NOx2_O2_RawNotRlb
OXY_NOx2_O2_RawNotRlb - Other Definitions: NOX_Snsr2_O2_NotRlb
Bundle Name: OXY_NOx2ChkFlt
OXY_NOx2ChkFlt - Other Definitions: OXY_NOx2ChkLoadFlt, OXY_NOx2ChkOvrrnFlt
Bundle Name: OXY_NOx2ChkLoadFlt
P2A01
Bundle Name: OXY_NOx2ChkOvrrnFlt
P11B3

Bundle Name: OXY_NOx2DecrDynFlt
P013B
Bundle Name: OXY_NOx2IncrDynFlt
P013A
Bundle Name: OXY_NOx2SignRngChkFlt
OXY_NOx2SignRngChkFlt - Other Definitions: OXY_NOx2SignRngMaxFlt, OXY_NOx2SignRngMinFlt
Bundle Name: OXY_NOx2SignRngMaxFlt
P22B7
Bundle Name: OXY_NOx2SignRngMinFlt
P22B6
Bundle Name: OXY_O2_Cat2_UpFlt
OXY_O2_Cat2_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: EPM_O2_Pipe4_DwnFlt
Bundle Name: OXY_O2_CatUpFlt
OXY_O2_CatUpFlt - Other Definitions: EXM_O2_ExhMnfdNotValid
Bundle Name: OXY_O2_DPF_UpFlt
OXY_O2_DPF_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: CAT_O2_Cat2_DwnFlt, C_DPF_UI_SCR: CAT_O2_CatDwnFlt
Bundle Name: OXY_O2_HCI_UpFlt
OXY_O2_HCI_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: EPM_O2_Pipe3_DwnFlt
Bundle Name: OXY_O2_NOx1_PresCmpNotRlb
OXY_O2_NOx1_PresCmpNotRlb - Other Definitions: OXY_NOx1_O2_RawNotRlb
Bundle Name: OXY_O2_NOx1_SDC_CrtdNotRlb
OXY_O2_NOx1_SDC_CrtdNotRlb - Other Definitions: OXY_O2_NOx1_PresCmpNotRlb
Bundle Name: OXY_O2_NOx1PlausMdlFlt
OXY_O2_NOx1PlausMdlFlt - Other Definitions: EXM_O2_ExhMnfdNotValid

Bundle Name: OXY_O2_NOx2_PresCmpNotRlb
OXY_O2_NOx2_PresCmpNotRlb - Other Definitions: OXY_NOx2_O2_RawNotRlb
Bundle Name: OXY_O2_NOx2_SDC_CrtdNotRlb
OXY_O2_NOx2_SDC_CrtdNotRlb - Other Definitions: OXY_O2_NOx2_PresCmpNotRlb
Bundle Name: OXY_O2_Pipe1_UpFlt
OXY_O2_Pipe1_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: CAT_O2_CatDwnFlt, C_DPF_UI_SCR: DPF_O2_DPF_DwnFlt
Bundle Name: OXY_O2_Pipe2_UpFlt
OXY_O2_Pipe2_UpFlt - Other Definitions: EPM_O2_Pipe1_DwnFlt
Bundle Name: OXY_O2_Pipe3_UpFlt
OXY_O2_Pipe3_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: SCR_O2_SCR_DwnFlt, C_DPF_UI_SCR: EPM_O2_Pipe2_DwnFlt
Bundle Name: OXY_O2_Pipe4_UpFlt
OXY_O2_Pipe4_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: HCI_O2_HCI_DwnFlt
Bundle Name: OXY_O2_SCR_UpFlt
OXY_O2_SCR_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: EPM_O2_Pipe2_DwnFlt, C_DPF_UI_SCR: EPM_O2_Pipe3_DwnFlt
Bundle Name: OXY_O2_SnsrCatUpFlt
OXY_O2_SnsrCatUpFlt - Other Definitions: OXY_NOx1_O2_Flt
Bundle Name: OXY_O2_SnsrPipe3_UpFlt
OXY_O2_SnsrPipe3_UpFlt - Other Definitions: C_UI_SCR_HCI_C_DPF: OXY_NOx2_O2_Flt
Bundle Name: PowertrainRelayFault
P1682, P16A7, P16BC
Bundle Name: PowertrainRelayStateOn_FA
P0685, P0686, P0687

Bundle Name: SBR_RlyFA
P16D7, P16D8, P16D9
Bundle Name: SCR_ChemicalMdlFlt
SCR_ChemicalMdlFlt - Other Definitions: EGP_PresSCR_UpFlt EGP_PresSCR_DwnFlt NOX_NOx_Rat_SCR_UpFlt NOX_Snsr1_NOx_Flt SCR_ThermalMdlFlt
Bundle Name: SCR_DEF_PumpCmdFA
P1057, P1058, P1059
Bundle Name: SCR_DEFLH_ElecFltSt
P20BF, P20C0, P20BD
Bundle Name: SCR_DEFLS_ElecFltSt
P203D, P203C
Bundle Name: SCR_DEFMV_FA
P2047, P1049, P1048, P2049, P2048
Bundle Name: SCR_DEFMV_PresDropFlt
SCR_DEFMV_PresDropFlt - Other Definitions: EGT_TempDEFMV_UpFlt EGP_PresDEFMV_DwnFlt EXF_TotExhDEFMV_UpFlt
Bundle Name: SCR_DEFPM_FA
P208A, P208C, P208D, P1040, P103F, P214E, P1056
Bundle Name: SCR_DEFPS_FA
P204D, P204C, P204B
Bundle Name: SCR_DEFTH_ElecFltSt
P20BB, P20BC, P20B9
Bundle Name: SCR_DEFTH_FA
P20BB, P20BC, P20B9, P1051
Bundle Name: SCR_DEFTS_ElecFltSt
P205C, P205D
Bundle Name: SCR_DEFTS_FA
P205D, P205C, P205B
Bundle Name: SCR_HC_SCR_DwnFlt
SCR_HC_SCR_DwnFlt - Other Definitions: EGP_PresSCR_UpFlt EGP_PresSCR_DwnFlt OXY_O2_SCR_UpFlt HCI_HC_dm_SCR_UpFlt SCR_ThermalMdlFlt
Bundle Name: SCR_LineHeatSplyVoltFA
P248C
Bundle Name: SCR_O2_SCR_DwnFlt
SCR_O2_SCR_DwnFlt - Other Definitions:

EGP_PresSCR_UpFlt EGP_PresSCR_DwnFlt OXY_O2_SCR_UpFlt HCI_HC_dm_SCR_UpFlt SCR_ThermalMdlFlt
Bundle Name: SCR_PM_SCR_DwnFlt
SCR_PM_SCR_DwnFlt - Other Definitions: SOT_PM_SCR_UpFlt
Bundle Name: SCR_PmpRtrStlFA
P105A
Bundle Name: SCR_PresGovDvtnHiFA
P20E9
Bundle Name: SCR_RDP_Flt
P2BAA
Bundle Name: SCR_SCR_PresDropFlt
SCR_SCR_PresDropFlt - Other Definitions: EGT_TempSCR_UpFlt EXF_TotExhSCR_UpFlt EGP_PresSCR_DwnFlt
Bundle Name: SCR_TankHeatSplyVoltFA
P248A
Bundle Name: SCR_TempSCR_DwnFlt
SCR_TempSCR_DwnFlt - Other Definitions: SCR_ThermalMdlFlt
Bundle Name: SCR_ThermalMdlFlt
SCR_ThermalMdlFlt - Other Definitions: EXF_TotExhSCR_UpFlt EGT_TempSCR_UpFlt OAT_OAT_SnsrNonEmissFA VehicleSpeedSensor_FA AmbPresDfltdStatus
Bundle Name: SCR_TipStuckFltSt
P202E
Bundle Name: SCR_TotExh_DEFMV_DwnFA
SCR_TotExh_DEFMV_DwnFA - Other Definitions: EXF_TotExh_DEFMV_UpFA
Bundle Name: SCR_TotExh_DEFMV_DwnFlt
SCR_TotExh_DEFMV_DwnFlt - Other Definitions: EXF_TotExhDEFMV_UpFlt
Bundle Name: SOT_ElecIFault
P1474, P1475, P1476, P24B3, P24B5, P24B6, P24B0, P24B1, P1477, P1478, P142D, P142C, P142F, P142E
Bundle Name: SOT_ExhPresSootSnsrVld

SOT_ExhPresSootSnsrVld - Other Definitions:
NOT(EGP_PresDPF_DwnFlt)

Bundle Name: SOT_ExhTempSootSnsrVld

SOT_ExhTempSootSnsrVld - Other Definitions:
IF (NOT EGT_SnsrDPF_DwnPresent OR EGT_SnsrDPF_DwnFlt) = 1

THEN (NOT (EGT_SnsrDPF_DwnFlt))

ELSE (True)

EGT_SnsrDPF_DwnFlt (if Temperature sensor Downstream DPF is not present or faulty)
True (if Temperature sensor Downstream DPF is present or not faulty)

Bundle Name: SOT_PM_Cat2_UpFlt

SOT_PM_Cat2_UpFlt - Other Definitions:
DOC+DPF+SCR: False; DOC1+SCR+DOC2+DPF: EPM_PM_Pipe4_DwnFlt

Bundle Name: SOT_PM_CatUpFlt

SOT_PM_CatUpFlt - Other Definitions:
EXM_PM_TurbFlowNotVld

Bundle Name: SOT_PM_DPF_UpFlt

SOT_PM_DPF_UpFlt - Other Definitions:
DOC+DPF+SCR:CAT_PM_CatDwnFlt; DOC1+SCR+DOC2+DPF: CAT_PM_Cat2_DwnFlt

Bundle Name: SOT_PM_Pipe1_UpFlt

SOT_PM_Pipe1_UpFlt - Other Definitions:
DOC+DPF+SCR:DPF_PM_DPF_DwnFlt; DOC1+SCR+DOC2+DPF: CAT_PM_CatDwnFlt

Bundle Name: SOT_PM_Pipe2_UpFlt

SOT_PM_Pipe2_UpFlt - Other Definitions:
EPM_PM_Pipe1_DwnFlt

Bundle Name: SOT_PM_Pipe3_UpFlt

SOT_PM_Pipe3_UpFlt - Other Definitions:
DOC+DPF+SCR:EPM_PM_Pipe2_DwnFlt; DOC1+SCR+DOC2+DPF: SCR_PM_SCR_DwnFlt

Bundle Name: SOT_PM_Pipe4_UpFlt

SOT_PM_Pipe4_UpFlt - Other Definitions:

DOC+DPF+SCR: False; DOC1+SCR+DOC2+DPF: EPM_PM_Pipe3_DwnFlt
Bundle Name: SOT_PM_SCR_UpFlt
SOT_PM_SCR_UpFlt - Other Definitions: DOC+DPF+SCR:EPM_PM_Pipe3_DwnFlt; DOC1+SCR+DOC2+DPF: EPM_PM_Pipe2_DwnFlt
Bundle Name: SOT_SootSnsrFlt
P24D0, P1474, P1475, P1476, P24B3, P24B5, P24B6, P24B0, P24B1, P1477, P1478, P142D, P142C, P142F, P142E, P24C7, P118B, P147B, P1479, P1488, P142B, P1435, P1436, P24D1
Bundle Name: SOT_TotExhSootSnsrVld
SOT_TotExhSootSnsrVld - Other Definitions: NOT(EXF_TotExhDPF_UpFlt)
Bundle Name: SWC_SwirlShtOffReq
P2008, P2009, P2010, P12B0, P12B1, P12B2, P201B, P201D, P20F8, P2004, P200A, P2015, P2016, P2017, P2006, P12AF
SWC_SwirlShtOffReq - Other Definitions:
Bundle Name: THMR_AHV_FA
P2681, P26A3, P26A6, P26A7, P26A9
THMR_AHV_FA - Other Definitions:
Bundle Name: THMR_AWP_AuxPumpFA
B269A, B269C, B269D
Bundle Name: THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4
Bundle Name: THMR_SWP_Control_FA
P261A, P261D, P261C
Bundle Name: THMR_SWP_FlowStuckOn_FA
P261A, P261D, P261E
Bundle Name: THMR_SWP_NoFlow_FA
P261B, P261C
Bundle Name: TPS_FA
P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2, P2135
Bundle Name: TPS_MtrCurrLimTFTKO
P02EB
Bundle Name: TPS_PstnDvtnFA
P02E4, P02E5
Bundle Name: TPS_PstnDvtnTFTKO
P02E4, P02E5
Bundle Name: TPS_PstnShtOffReq

P02E4, P02E5, P02E8, P02E9, P122D, P16A0, P16A1, P16A2, P02E0, P02E2, P02E3, P02EB, P122B, P122C, P1425
Bundle Name: TPS_PstnSnsrFA
P02E8, P02E9, P122D, P16A0, P16A1, P16A2
Bundle Name: TPS_SENT_OOR_Flt
P16A0, P16A1
Bundle Name: TPS_SENT_PerfFlt
P16A2
Bundle Name: Transmission Estimated Gear Validity
P0502, P0503, P0722, P0723, P077C, P077D, P0729, P0731, P0732, P0733, P0734, P0735, P0736, P076F, P18C4, P18C5, P18C6, P18C7, P18C8, P18C9, P18CA
Bundle Name: Transmission Gear Ratio Validity
P0716, P0717, P0722, P0723, P077C, P077D, P07BF, P07C0
Bundle Name: Transmission Output Shaft Angular Velocity Validity
P0722, P0723, P077C, P077D
Bundle Name: TransmissionEngagedState_FA
P1824, P182A, P182B, P182C, P182D, P182E, P182F, P1838, P1839, P1840, P1841, P18B5, P18B6, P18B7, P18B8, P18B9, P18BA, P18BB, P18BC, P18BD, P18BE, P18BF, P18C0, P18C1, P18C2, P18C3, P1915
Bundle Name: VehicleSpeedSensor_FA
P0502, P0503, P0722, P0723
Bundle Name: VGT_ActCktTFTKO
DC Motor: P0045, P0047, P0048, P169E, P169F, P16FA, P16FC. Vacuum: P0045, P0047, P0048
Bundle Name: VGT_ActrDiagShtOff
DC Motor: P0045, P0047, P0048, P169E, P169F, P16FA, P16FC, P2564, P2565, P16B0, P16B1, P16B2, P003A, P2598, P2599. Vacuum: P0045, P0047, P0048, P2564, P2565, P16B0, P16B1, P16B2, P003A, P2598, P2599. VGT Smart: P003A, P00AF, P0046
VGT_ActrDiagShtOff - Other Definitions: VGT Smart: CFM_VGT_CommFA, CFM_VGT_CommTFTKO
Bundle Name: VGT_ActrDiagShtOffFA
DC Motor: P0045, P0047, P0048, P169E, P169F, P16FA, P16FC, P2564, P2565, P16B0, P16B1, P16B2, P003A, P2598, P2599. Vacuum: P0045, P0047, P0048, P2564, P2565, P16B0, P16B1, P16B2, P003A, P2598, P2599. VGT Smart: P003A, P00AF, P0046
VGT_ActrDiagShtOffFA - Other Definitions: VGT Smart: CFM_VGT_CommFA
Bundle Name: VGT_PstnCntrlTFTKO
VGT DC Motor and Vacuum: P2598, P2599. VGT Smart: P0046
Bundle Name: VGT_PstnSnsrCktFA
P2564, P2565, P16B0, P16B1, P16B2
Bundle Name: VGT_PstnSnsrCktTFTKO
P2564, P2565, P16B0, P16B1, P16B2
Bundle Name: VGT_PstnSnsrOfstFA

P003A
Bundle Name: VGT_PstnSnsrRatltyFlt
P003A
Bundle Name: VGT_PstnSnsrTFTKO
VGT DC Motor and Vacuum: P2564, P2565, P16B0, P16B1, P16B2, P003A. VGT Smart: P003A
Bundle Name: VGT_SmartActrFA
P00AF
Bundle Name: WGA_ActrDiagShtOff
P0243, P0245, P0246, P0247, P0249, P0250
Bundle Name: WGA_ActrDiagShtOffFA
P0243, P0245, P0246, P0247, P0249, P0250
Bundle Name: XOY_SecurityFlt
P16F3
XOY_SecurityFlt - Other Definitions: Latched security fault status
Bundle Name: XOY_SecurityFlt_CeXOYR_e_ETMR_FTD_RedntCalcFlt
P16F3
XOY_SecurityFlt_CeXOYR_e_ETMR_FTD_RedntCalcFlt - Other Definitions: Latched security fault status for case "Fuel Injector Backflow Temperature ET Compensation Redundant Fault"
Bundle Name: XOY_SecurityFlt_CeXOYR_e_FULR_FTD_RateLimFlt
P16F3
XOY_SecurityFlt_CeXOYR_e_FULR_FTD_RateLimFlt - Other Definitions: Latched security fault status for case "Fuel Injector Backflow Temperature Rate Limit Fault"
Bundle Name: ZeroTorq
ZeroTorq - Other Definitions: see PID $62
Bundle Name: ZeroTorqPrdtdActv
ZeroTorqPrdtdActv - Other Definitions: This fault bundle is based on RawIndicatetRequest (PID $245C) and other requestors (i.e. accelerator pedal)

17 OBDG04 Fault Bundle Definitions

Bundle Name: GLO_GlowPlugSplyVoltCktTFTKO
P161E
Bundle Name: VGT_ActCktFA
P0045, P0048, P169E, P169F, P16FA
Bundle Name: VGT_PstnCntrlFA
P2599, P2598
Bundle Name: VGT_PstnSnsrFA
P2564, P2565, P16B0, P16B1, P16B2, P003A
Bundle Name: VGT_SENT_OOR_Flt
P16B0, P16B1
Bundle Name: VGT_SENT_PerfFlt
P16B2

Bundle Name: AcceleratorPedalFailure
P2122, P2123, P2127, P2128, P2138, P0697, P06A3
Bundle Name: ACCMLostComm
U016B
Bundle Name: ACFailedOnSD
See ACCM Document
Bundle Name: ACHighSidePressSnsrCktFA
P0532, P0533
Bundle Name: ACThrmlRefrigSpdVld
See ACCM Document
Bundle Name: AmbientAirDefault
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
Bundle Name: CAT_HC_CatDwnFlt
CAT_HC_CatDwnFlt - Other Definitions: HCI_HC_dm_CatUpFlt || if SootLoading then OXY_O2_SnsrCatUpFlt else OXY_O2_CatUpFlt || EXF_TotExhCatUpFlt || EGT_SnsrCatUpFlt || EGP_PresCatUpFlt || AmbientAirDefault || VehicleSpeedSensor_FA || CAT_OutsideTempFA
Bundle Name: CEW_TempInCktFA
P0407, P0408
Bundle Name: CEW_TempInSlfCorFA
P046F
Bundle Name: CEW_TempSnsrInFA
P0407, P0408, P046F, P046E
Bundle Name: ClutchPstnSnsrCktHi FA
P0808
Bundle Name: ClutchPstnSnsrCktLo FA
P0807
Bundle Name: ECT_Sensor_TFTKO
P0116, P0117, P0118, P0119, P0128, P111E
ECT_Sensor_TFTKO - Other Definitions:
Bundle Name: EngOilPressureSensorCktFA
P0522, P0523
Bundle Name: EngOilPressureSensorFA
P0521, P0522, P0523
Bundle Name: EngOilTempFA
EngOilTempSensorCircuitFA, EngOilModeledTempValid, P16F3

EngOilTempFA - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt(CeXOYR_e_EOTR_SecurityFlt)
Bundle Name: OilPmpTFTKO
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpTFTKO - Other Definitions: TFTKO only for Output Driver and rationality
Bundle Name: PistonCoolingCktFA
P25A9, P25AA, P25AB
Bundle Name: PistonCoolingFA
P25A9, P25AA, P25AB, P25AC, P25AD
Bundle Name: PistonCoolingStuckClosed
P25AA, P25AD
Bundle Name: PistonCoolingStuckOpen
P25A9, P25AB, P25AC
Bundle Name: SWC_DrvrCktFA
P2008, P2009, P2010
Bundle Name: SWC_IntegSlowRespFA
P200A
Bundle Name: SWC_ObstructionFlt
P20F8
Bundle Name: SWC_PstnFdbckElecFA
P2015, P2016, P2017

Bundle Name: BrakeBoosterSensorCktFA
P0557, P0558

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Performance	P064C	Electronic circuitry determines fault with GP switch	Glow Plug Current and Glow plug is commanded and voltage at glow plug	< = =	3.2 On 0	amps volts	glow plugs are commanded on DTCs P163C, P0671-P0678	=	True Not set		fail conditions exists for 3.5 seconds. monitor runs with 0.5 s rate whenever enable conditions are met.	Type B, 2 Trips
		Checksum error between calculated and stored values are compared	ROM error: Checksums match	=	NO		Module power		On		fail conditions exists for 4.5 s. monitor runs with 1.5 s rate whenever enable conditions are met.	
		Compariarson of read write values	RAM error: Read write values match	=	NO		Module power		On		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	
		Checksum error between calculated and stored values	EEPROM error: Checksums match	=	NO		Module power		On		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	
		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Under voltage	<=	Battery voltage at GPCM + 7	volts	Battery voltage at GPCM	>	6	volts	fail conditions exists for 3.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	
		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Over voltage	>=	Battery voltage at GPCM + 18	volts					fail conditions exists for 3.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	
		Elecrtonic circuitry determines that the reverse polarity protection voltage drop is in range	GPCM reverse polarity switch "high voltage drop" Path 1 [Battery voltage at GPCM - mean glow plug voltage value] Path 2 (Battery voltage at GPCM - mean glow plug voltage value with charge pump off) - (Battery - mean glow plug voltage value with charge pump on	 > <	2.3 0.300	volts volts	glow plugs are commanded Battery voltage at GPCM GP current GP current P0671,P0672, P0675, P0676 Battery voltage at GPCM stable for 30ms	= > > < = <	On 5 3.2 60 Not set 2	 volts amps amps volts	Path1: fail conditions exists for 9 seconds. monitor runs with 6 s rate whenever enable conditions are met. Path2: fail conditions exists for 13 seconds. monitor runs with 10 s rate whenever enable conditions are met.	
		Internal and external Watchdogs are monitored for interuption Monitor for undefined instruction code interupt Monitor for osolation stop detection	GPCM running reset: number of running resets or undefined instruction code detected or Osolation stop detection	>	9 events in a row		none				fail conditions exists for 5 seconds. monitor runs with 2 s rate whenever enable conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		measure temperature of the SBC	system basic chip (SBC) over temperature: temperature of the high side switch inside the SBC	>	155	deg C	Internal GPCM temperature	<	100	deg C	fail conditions exists for 3.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	
Glow Plug 1 through 8 Circuit Fault	P0671- P0678	glow plug open: electronic circuitry determines a fault exists on GP circuit	Glow Plug Current and voltage at glow plug pin	< >	4.00 and 6.0	amps volt	Ignition - glow plugs are commanded on P163D,P163C Supply voltage	= > >	On 5 not set 8.5	 secs volts	fail conditions exists for 1.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	Type B, 2 Trips
		glow plug high resistance: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance AND Glow Plug Current	> >=	1.83 4.00	ohm amps	Ignition on Battery voltage at GPCM glow plugs are commanded on over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= > = = = <	on 7.0 on false false 7.0	 volts volts	fail conditions exists for 1.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	
Glow Plug 1 through 8 Circuit Fault	P066A- P068E	glow plug short: electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Current Path 2: Hardware over current	> >	60 100	amps amps	Ignition glow plug command over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= = = = <	on on false false 6.0	 volts	Path1: fail conditions exists for 1.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met. Path2: fail conditions exists for 1.26 seconds. monitor runs with 0.26 s rate whenever enable conditions are met.	Type B, 2 Trips

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Glow plug low resistance: electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Resistance Path 2: Glow Plug Resistance	< 	250 500	mOhm mOhm	glow plugs are commanded on over temperature condition over voltage condition- abs[Battery supply at GPCM - IGN voltage at GPCM] glow plugs "on" duration glow plugs are commanded on over temperature condition over voltage condition- abs[Battery supply at GPCM - IGN voltage at GPCM] glow plugs "on" duration	= = = > > = = = > >	on false false 7.0 glow plugs "on" for more than 600 ms on false false 7.0 glow plugs "on" for more than 10 sec	volts volts	fail conditions exists for 1.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	
Lost Communication With Glow Plug Control Module	U0106	GMLAN Communication ECM -> GPCM: ECM monitors serial data from GPCM for U0106. Error Message indicating GPCM is not receiving major GMLAN signals.	Timeout of message $C9 or Timeout of message $4C1 or Timeout of message $4F1	> > >	0.100 2 3	sec sec sec	Ignition 1 battery voltage at GPCM	> >	3.9 7.0	volts	fail conditions exists for 11 seconds. monitor runs with 10 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Not Programed	P161A	ECM monitors serial data from GPCM for P161A. GPCM is configured as service part by calibration parameter	Glow Plug Control Module determines settings of configuration parameter located in calibration data set				Ignition	=	ON		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	Type A, 1 Trip
Glow Plug Module Primary Circuit	P163C	Electronic GPCM circuitry determines the voltage supply to GPCM is out of range	PATH 1: voltage supply to GPCM or PATH 2: (voltage supply to GPCM- IGN) or PATH 3: (voltage supply to GPCM -ECM reported voltage via CAN)	< > >	6.0 +/-5 +/-3	volt volt volt	GPCM Ignition voltage or GPCM voltage supply GPCM Ignition voltage or GPCM supply voltage Engine speed	> > > > >	9.0 6.0 4.0 6 10< rpm >400	volt volt volt volt rpm	fail conditions exists for 4 seconds. monitor runs with 1 s rate whenever enable conditions are met.	Type B, 2 Trips

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Module Secondary Circuit	P163D	Electronic GPCM circuitry determines serveral signal voltage levels to GPCM are out of range	Path 1: Key state (Ign 1) or Path 2: Electronic circuitry determines voltage at glow plug pin or Path 3: [GPCM ground - GP ground]	= > >	OFF 6.0 +/-1.5	 volt volts	Path 1 glow plug activation request from ECM or Path 2 GP commanded or Path 3 GP commanded DTCs not set	= = =	ON or Off or ON P0671,P0675		fail conditions exists for 4 seconds. monitor runs with 1 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (µC) Circuit Low voltage	P16AD	ECM monitors serial data from GPCM for P16AD Error Message indicating GPCM detects GPCM temperature sensor (µC) voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	0.078	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (HSS14) Circuit Low voltage	P101B	ECM monitors serial data from GPCM for P101B Error Message indicating GPCM detects GPCM temperature sensor (HSS14) voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	0.078	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (HSS58) Circuit Low voltage	P101D	ECM monitors serial data from GPCM for P16AD Error Message indicating GPCM detects GPCM temperature sensor (HSS58) voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	0.078	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (µC) Circuit High voltage	P16AE	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensor (µC) voltage our of range high	GPCM temperature sensor voltage	>	4.916	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips

17 OBDG04 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Temperature Sensor (HSS14) Circuit High voltage	P101C	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensor (HSS58) voltage our of range high	GPCM temperature sensor voltage	>	4.916	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (HSS58) Circuit High voltage	P101E	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensor (HSS58) voltage our of range high	GPCM temperature sensor voltage	>	4.916	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature at µC not plausible	P101F	ECM monitors serial data from GPCM for P101F Error Message indicating GPCM detects GPCM temperature sensor (µC) plausibility	PATH 1: Temp µC – Temp HSS14 and Temp µC – Temp HSS58 and Temp HSS58 – Temp HSS14	> > <=	12 12 12	Kelvin Kelvin Kelvin	Glow plugs Off Reset protection flag P16AE, P101C, P101E P16AD, P101B, P101D	> = = =	30 False Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips
			PATH 2: Temp µC – Temp HSSnn	>	12	Kelvin	Glow plugs Off Reset protection flag and P16AE, P101C P16AD, P101B or P16AE, P101E P16AD, P101D	> = = = = =	30 False Not Set Not Set Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
Glow Plug Control Module Temperature at HSS14 not plausible	P102D	ECM monitors serial data from GPCM for P102D Error Message indicating GPCM detects GPCM temperature sensor (HSS14) plausibility	PATH 1: Temp HSS14 – Temp HSS58	>	15	Kelvin	Glow plugs commanded on P101C, P101E P101B, P101D	= = =	On Not Set Not Set		fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			PATH 2: Temp HSS14 – T_HSS58	>	12	Kelvin	Glow plugs Off	>	30	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
							Reset protection flag	=	False			
			and									
							and					
			Temp HSS14 – Temp µC	>	12	Kelvin						
							P16AE, P101C, P101E	=	Not Set			
			and				P16AD, P101B, P101D	=	Not Set			
			Temp HSS58 – Temp µC	<=	12	Kelvin						
			PATH 3:Temp HSS14 – Temp T nn	>	12	Kelvin	Glow plugs Off	>	30	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
							Reset protection flag	=	False			
							and					
							P101C, P16AE	=	Not Set			
							P101B, P16AD	=	Not Set			
							or					
							P101C, P101E	=	Not Set			
							P101B, P101D	=	Not Set			
Glow Plug Control Module Temperature at HSS58 not plausible	P102E	ECM monitors serial data from GPCM for P102E Error Message indicating GPCM detects GPCM temperature sensor (HSS58) plausibility	PATH 1: Temp HSS58 – Temp HSS14	>	15	Kelvin	Glow plugs commanded on	=	On		fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips
							P101C, P101E	=	Not Set			
							P101B, P101D	=	Not Set			
			PATH 2: Temp HSS58 – T_HSS14	>	12	Kelvin	Glow plugs Off	>	30	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
							Reset protection flag	=	False			
			and									
							and					
			Temp HSS58 – Temp µC	>	12	Kelvin						
							P16AE, P101C, P101E	=	Not Set			
			and				P16AD, P101B, P101D	=	Not Set			
			Temp HSS58 – Temp HSS14	<=	12	Kelvin						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			PATH 3:Temp HSS58 – Temp T nn	>	12	Kelvin	Glow plugs Off Reset protection flag and P101C, P16AE P101B, P16AD or P101C, P101E P101B, P101D	> = = = = =	30 False Not Set Not Set Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
Glow Plug Control Module Temperature system not plausible	P102F	ECM monitors serial data from GPCM for P102F Error Message indicating GPCM detects GPCM temperature system plausibility	Temp µC – Temp HSS14 and Temp µC – Temp HSS58 and Temp HSS58 – Temp HSS14	> > >	12 12 12	Kelvin Kelvin Kelvin	Glow plugs Off Reset protection flag P16AE, P101C, P101E P16AD, P101B, P101D	> = = =	30 False Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips
Glow Plug 1 through 8 diagnostic when glow plugs are performing a heat up procedure (ramp up) after GPCM is powered up	P06C5-P06CC	glow plug low resistance at power up: electronic circuitry determines a fault exists on GP circuit at power up	Glow Plug Resistance and Glow Plug Current	< >=	0.160 + .003 * N_PWM Cycles 4.00	ohm amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag	= > = = < =	on 7.0 false false 7.0 false	 volts volts	fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 2.55 seconds after power up. Monitor runs with 0,06 s rate whenever conditions are met during ramp up.	Type B, 2 Trips

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		glow plug high resistance at power up: electronic circuitry determines a fault exists on GP circuit at power up	Glow Plug Resistance and Glow Plug Current	> >=	0.550 + .050 * N_PWM Cycles 4.00	ohm amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag P066A-P068F	= > = = < = =	on 7.0 false false 7.0 false Not Set	 volts volts 	fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 2.55 seconds after power up. Monitor runs with 0,06 s rate whenever conditions are met during ramp up.	
		glow plug low resistance gradient: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance Gradient and Glow Plug Current	< >=	0.070/0.62 4.00	ohm / sec amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag P066A-P068F	= > = = < = =	on 7.0 false false 7.0 false Not Set	 volts volts 	fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 2.55 seconds after power up. Glow plug resitance measurement runs continiuously whenever conditions are met during ramp up.	
		glow plug resistance gradient low range: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance Gradient and Glow Plug Current	< >=	0.088/0.524 4.00	ohm/ sec amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag P066A-P068F	= > = = < = =	on 7.0 false false 7.0 false Not Set	 volts volts 	fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 2.55 seconds after power up. Glow plug resitance measurement runs continiuously whenever conditions are met during ramp up.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		glow plug resistance gradient range high: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance Gradient and Glow Plug Current	> >=	0.800/0.524 4.00	ohm/ sec amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag P066A-P068F	= > = = < = =	on 7.0 false false 7.0 false Not Set	 volts volts	fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 2.55 seconds after power up. Glow plug resitance measurement runs continiuously whenever conditions are met during ramp up.	
Glow Plug 1 through 8 Hot resistance fault	P1338-P133F	glow plug hot resistance low: electronic circuitry determines a fault exists on GP circuit	Glow Plug Hot Resistance and Glow Plug Current	< >=	0.700 4.00	ohm amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag EOT or 20 sec Characterization	= > = = < = => =	on 7.0 false false 7.0 false 240 True	 volts volts sec	Diagnostic performed after characterization: 2.5 seconds or 20 seconds or failure status stored in EEPROM will be reported after 1.5 sec. after start up when characterization not performed	Type B, 2 Trips
		glow plug hot resistance: electronic circuitry determines a fault exists on GP circuit	Glow Plug Hot Resistance and Glow Plug Current	> >=	0.1700 4.00	ohm amps	Ignition Battery voltage at GPCM over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM] Reset protection flag EOT or 20 sec Characterization	= > = = < = => =	on 7.0 false false 7.0 false 240 True	 volts volts sec	Diagnostic performed after characterization: 2.5 seconds or 20 seconds or failure status stored in EEPROM will be reported after 1.5 sec. after start up when characterization not performed	
Glow plug control module over temperature	P263E	Glow plug control module over temperature	GPCM temperature - glow plug resistance gradients - glow plug Rhot resistance - failure status of Rhot resistance +E136	>	123	deg C	Glow plugs are commanded on coolant temp coolant temp	= < =	On 60 Valid	 deg C	As long as fail conditions exist. Monitor runs with 6.50 s rate whenever enable conditions are met.	Type B, 2 Trips

17 OBDG04 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow plug control module unable to complete GP ini	P1337	GP unable to complete characterization	PATH 1: Checksum error EEPROM: Resistance gradients	=	YES		MEC	=	0		Perfomed only at power up. Will be reported after 1.5 sec. whenever enabled conditions are met.	Type B, 2 Trips
			or									
			PATH 2: Checksum error EEPROM: hot resistance	=	YES							
			or									
			PATH 3: Faulty status in hot resistance	=	YES							