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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	Detects an Outside Air Temperature (OAT) sensor that is stuck in range. There are two components to the test: an engine off component, and an engine running component. If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled. If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move. For applications that have ability to move without engaging the internal combustion	**<u>Engine Off:</u>**		Diagnostic is Enabled		Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips
			If IAT >= OAT: IAT - OAT	> 20.0 deg C	Time between current ignition cycle and the last time the engine was running	>= 28,800.0 seconds		
			If IAT < OAT: OAT - IAT	> 20.0 deg C	Engine is not running			
			If either of the following conditions are met, this diagnostic will pass:		Vehicle Speed	>= 12.4 MPH		
					Coolant Temperature - IAT	< 15.0 deg C		
			If IAT >= OAT: IAT - OAT	<= 20.0 deg C	IAT - Coolant Temperature	< 15.0 deg C		
			If IAT < OAT: OAT - IAT	<= 20.0 deg C	OAT-to-IAT engine off equilibrium counter	>= 300.0 counts		
					The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off**			
					No Active DTCs:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.				EngineModeNotRunTimer Error		
			Engine Running: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	 > 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine air flow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Running** No Active DTCs:	 >= 28,800.0 seconds >= 12.4 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA	Executed every 100 msec until a pass or fail decision is made	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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	<= 4,620,000,076,293,950 Ohms (~150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	>= 42,775,709,375 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Too Low	P0087	Determines if rail pressure is below an absolute value.	Rail pressure	< 0 to 145 MPa (see table **P0087 Minimum rail pressure**)	Powertrain relay voltage Engine running, cranking excluded, for a time No IFT running (refer to FUL_IFT_St) Engine shut off request LowFuelConditionDiagnostic Fuel pressure estimated at high pressure pump inlet validity Fuel pressure estimated at high pressure pump inlet FuelPumpRlyCktFA FHP_MU_ZeroDeliveryFlt FHP_PR_FullDischargeFlt	>= 11.0 V >= 30.00 s == False == False == True >= 360.00 kPa == False == False == False	121 failures out of 242 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Performance	P0089	Determines when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 68 to 238 MPa (see table **P0089 Maximum rail pressure with MU** If extended area is disabled) OR > 68.00 to 238.00 MPa (see table **P0089 Extended Maximum rail pressure with MU** If extended area is enabled)	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*)	>= 11.0 V == True	121 failures out of 242 samples OR 121 continuous failures 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit	P0090	This DTC detects an Open Circuit on the Fuel Metering Unit valve	Current low across High and Low Side drivers during ON state indicates an open circuit.	Impedence between High Side and Low Side pins of the Fuel Metering Unit valve ≥ 200 kΩ	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61 failures out of 122 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit Low Voltage	P0091	This DTC detects a short circuit to ground of the Low Side driver circuit of the Fuel Metering Unit valve	Voltage low across Low Side driver during OFF state indicates short-to-ground.	Impedence between Low Side pin of the Fuel Metering Unit valve and the controller ground ≤ 0.5 Ω.	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61 failures out of 122 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 1 Control Circuit High Voltage	P0092	This DTC detects a short circuit to power of the Low Side driver circuit of the Fuel Metering Unit valve	Voltage high across Low Side driver during ON state indicates short to power.	Impedence between Low Side pin of the Fuel Metering Unit valve and the controller power ≤ 0.5 Ω.	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61 failures out of 122 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Circuit Performance (applications with IAT, IAT2 and IAT3)	P0096	Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and IAT3 sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT3 values are similar, and the IAT2 value is not similar to the IAT and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT2 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C <= 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in Middle</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	**Not Good Correlation, IAT3 in Middle** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 Low (applications with LIN MAF)	P0097	Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT 2 Temperature	< -60 degrees C	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 9.0 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 (applications with LIN MAF)	P0098	Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT 2 Temperature	> 150 degrees C	Dianostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 9.0 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.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 2 readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 >= 11.0 Volts >= 9.0 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 (2 intake air pressure sensor configuration)	P00C7	This monitor is used to identify if BARO and MAP pressure values are irrational when compared to each other. The plausibility monitor compares the BARO and MAP pressures when the engine is not running. If the two 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 two sensors.	Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 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 No Active DTCs: No Pending DTCs:	> 5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 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.
Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit Low	P00C9	This DTC detects a short circuit to ground of the high side driver circuit of the Fuel Metering Unit valve	Voltage high across High Side driver of the Fuel Metering Unit valve during ON state indicates short toground	Impedence between High Side pin of the Fuel Metering Unit valve and the controller ground ≤ 0.5 Ω	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61.00 failures out of 122.00 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit High	P00CA	This DTC detects a short circuit to high voltage of high side driver circuit of the Fuel Metering Unit valve	Voltage low across High Side driver of the Fuel Metering Unit valve during OFF state indicates short to power	Impedence between High Side pin of the Fuel Metering Unit valve and the controller power ≤ 0.5 Ω	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61.00 failures out of 122.00 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 ignition cycle if the	**<u>Good Correlation Between IAT and IAT2</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time (Engine Coolant Temp - Outside Ambient Temp) No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds <= 25.0 Deg C PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in Middle</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		enable conditions are met.			LIN communications established with MAF			
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimerError	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 Low	P00EA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT 3 Input	< 57,939,998,626,709,000.00 Ohms (~150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 High	P00EB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT 3 Input	> 153,665 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low (applications with LIN MAF)	P00F4	Detects an eroneously low value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	Relative Humidity	<= -625.00 %	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 9.0 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 (applications with LIN MAF)	P00F5	Detects an eroneously high value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	Relative Humidity	>= 10,625.00 %	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 9.0 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.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)	> 80 % 10 consecutive Humidity readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	>= 11.0 Volts >= 9.0 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure (MAP) Sensor Performance (3 intake air pressure sensor configuration)	P0106	This monitor is used to identify MAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If MAP sensor is not in agreement with the other two the monitor is able to pinpoint MAP as the faulty sensor.	Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			MAP sensor OR MAP sensor OR Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	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	< 33,299,999,237,060,500.0 % of 5 Volt Range (This is equal to 7.5 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 390.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	**<u>Not Good Correlation, IAT3 in Middle</u>** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 9.0 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimerError	Executes once at the beginning of each ignition cycle if enable conditions are met	

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 (applications with LIN MAF)	P0112	Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too low. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT Temperature	< -60 degrees C	Diagnostic is Enabled LIN Communications established with MAF		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor Performance (L5P)	P0116	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1 The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number. **Engine Outlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkInta keAirSnsr Comparison sensor 2: CeEECR_e_BiasChkOut sideAirSnsr Block Heater: CeEECR_e_AuxHeaterBi asHigh	50.0 ºC	Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdClntSnsr - BiasChkBlockClntSnsr - BiasChkEngInClntSnsr - BiasChkEngOutClntSnsr - BiasChkHtrCrInClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn	OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_EngineOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_EngineInlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCoreInlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_BypassInlet_CktFA EECR_CylHeadMetal1_CktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Threshold A: Threshold B: **Head Metal:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkNo Selection Comparison sensor 2: CeEECR_e_BiasChkNo Selection Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B: A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is	1,575.0 ºC 50.0 ºC 15.0 ºC >A ºC >A ºC >B ºC	sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr - BiasChk_EGRCoolerOutlet Comparison sensors ================== The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature ================= Comparison sensor 1 & 2 are not ================= Aux Heat Detection Aux heat detection can only be enabled the following are met:	EGRTempSensorUPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl <EECR_EGRCoolerOutletCoolant_FA> = Availible ≥ 28,800 seconds ≥ -20.0 ºC ≥ 28,800 seconds ≥ -9.0 ºC = CeEECR_e_BiasChkNoSelection		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			below both comparison sensors and an aux heat source has not been detected to cause this skew	>B ºC	No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application: 2x2 signature Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2:	Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrEngOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr > 1,575.00 ºC > 21,600 seconds > 21,600 seconds > -20.00 ºC Disabled Enabled Disabled Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for A block heater is detected if a drop is **IAT Drop Criteria:** The sensor will be used as IAT for this method A block heater will be	CeAEHR_e_BlkHtrEngOutClntSnsr CeAEHR_e_BlkHtrEngOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr CeAEHR_e_BlkHtrIntakeAirSnsr 5.0 ºC 5.0 ºC > 10.0 ºC CeAEHR_e_BlkHtrEngOutClntSnsr > 1.00 L/min 10,000,000,149,011,600.0 - 17.0 seconds < 77.0 seconds > 300.0 seconds > 175.0 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					detected if: IAT has a drop of during a drive defined by: Drive time Vehicle speed Addtional drive time is provided when vehicle speed drops below above threshold as follows This detection method will abort if the engine is off OR Engine runtime **Temperature Derivative Criteria:** Derivative will be monitored using Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected	CeAEHR_e_BlkHtrIntakeAirSnsr ≥ 5.0 ºC ≥ 400.0 seconds ≥ 24.0 kph 5.0 times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrEngOutClntSnsr > -1.00 L/min 5.0 - 15.0 seconds < 75.0 seconds > 300.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					=================	< -10,000,000,149,011,600 .00 ºC/sec ≥ 4 counts		

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 (L5P)	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) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit High (L5P)	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) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1	> X Ohms X is equal to: Temp Sensor 1: 175,000 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds ≥ -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent (L5P)	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1 The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time	7,400,000,095,367,430.0 seconds -60.0 °C 200.0 °C	Diagnostic is Enabled No Active DTC's	 ECT_Sensor_Ckt_FA EECR_EngineOut_Erratic_TFTKO	5 seconds out of a 6 seconds window Continuously sampled	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the caluculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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, 2 or 3: If the maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated. **Range 1 (Primary):** Ambient air temperature is between 10.0 and 52.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 11,100,000,381,469,700.0 °C. The target temperature for this range will not drop below 709,000,015,258,789.0 °C **Range 2 (Secondary):** Ambient air temperature is between -9.0 and 10.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the	**P0128 Maximum Acculated Energy - Primary** **P0128 Maximum Acculated Energy - Secondary**	Diagnostic is Enabled No DTCs Engine soak time Engine run time Engine Outlet Coolant Temperature - Range 1: - Range 2: - Range 3: Devices in main cooling circuit are not in in device control If Engine RPM is continuously greater than for this time period Distance traveled	THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_FlowStuckOn_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstInaccurate MAF_SensorFA ETHR_CoolantEnergyModel ETHR_RemedialActionLevel1 ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_EngineOutlet_FA > 1,800.0 seconds 20.0 - 1,800.0 seconds ≤ 51,599,998,474,121,100.0 °C ≤ 35,599,998,474,121,100.0 °C ≤ 35,599,998,474,121,100.0 °C	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.
			radiator (ie: thermostat) minus 27.0 °C. The target temperature for this range will not drop below 27.0 °C **Range 3 (Tertiary):** Ambient air temperature is between -9,100,000,381,469,730.0 and -9.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 27.0 °C. The target temperature for this range will not drop below 27.0 °C	**P0128 Maximum Acculated Energy - Tertiary** This diagnostic models the net energy into and out of the cooling system during the warm-up process. The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat loss to autostop.	The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off Cumulative coolant flow	8,192 rpm 5.0 seconds ≥ 2.0 km > 5.0 °C > 0.00		

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

Fuel Temperature Sensor A Performance	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	IF the fuel fired heater has not been active
			{
			The average for the difference in absolute value between temperature measured by the fuel filter sensor and the reference sensor is:
			}
			
			ELSE
			
			(see
			P0181 Fuel Temperature Sensor Reference
			)
				> 20.00 °C
				
				> 20.00 °C
					Engine off time
					
					Time since engine start rotating
					
					No error for Engine Not Running timer
					
					No electrical fault on the fuel filter temperature sensor
					
					No fault on the reference temperature sensor
					
					At least one valid value received from serial communication
					
					(Engine coolant temperature
					
					OR
					
					ECT_OBD_GlobalCoolTmpEnbl
					(refer to "OBD Coolant Enable Criteria" section))
					
					Number of acquired samples for the absolute difference between fuel filter temperature and reference temperature
					
					Fuel Filter Heater turned Off
					
					Sensor Bus Relay
						> 28,800.00
						
						< 1.00
						
						FTS_FTS_CktFA
						
						FTS_PlausRefSnsrFlt
						
						> -40.00
						
						< 3.00
							3.00 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.
					commanded on No fault on the sensor bus relay No fault in the serial communication	 SBR_RlyFA P1103		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit Low	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	< 50,470,001,220,703,100 Ω	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 SBR_RlyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 * 6,666,000,001,132,49 0.00)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 FTS_FTS_CktFA SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	< (1 - α) * -56 °C + (Last good sample * α) with α = e^[- (amount of consecutive bad samples * 6,666,000,001,132,49 0.00)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0 V ≥ 11.0 V ≥ 8.00 FTS_FTS_CktFA SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor B Performance	P0186	Determine when a significant offset affects the temperature sensor located in the fuel rail. The faulire criteria is performed comparing the temperature measured by sensor located in the fuel rail and the manifold temperature sensor	The difference in absolute value between temperature measured by the rail temperature sensor and the reference sensor (Manifold Temperature Sensor) is	> 20.00	Run crank voltage OR Time since engine is rotating No error for Engine Not Running timer Engine soak time No Fault Active in the Manifold Temperature Sensor MnfdTempSensorFA The diagnostic feedback protocol is providing information about rail temperature (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "OBD Coolant Enable Criteria" section)) Ambient temperature	> 6.0 V < 3.00 > 28,800.00 == FALSE > -40.00 °C > KeFHPI_T_AmbTempMin	21.00 failures out of 42.00 samples 6.25 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	> 12.0 % < 8.0 %	Engine off time No error for Engine Not Running timer No engine movement detected since begin of driving cycle (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "*OBD Coolant Enable Criteria*" section)) Run crank voltage Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed No active DTC:	≥ 1,000 s ≥ -40 °C = TRUE > 6.0 V ≥ 11.0 V ECT_Sensor_FA FHP_RPS_CktFA	14 failures out of 17 samples 6.25 ms/sample	Type A, 1 Trips
			Absolute difference between rail pressure #1 (first trace) and rail pressure #2 (second trace)	> 25.0 MPa	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time	= CeFHPG_e_RPS_DoubleTrack ≥ 15,000 s	14 failures out of 17 samples 6.25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Run crank voltage	> 841,015,625.0 V		
					No active DTC:	FHP_RPS_CktFA FHP_RPS2_CktFA P0194		
					The diagnostic feedback protocol is in the state outputting the redundant pressure information			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	< 4.0 %	(Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed	 ≥ 15,000 s > 841,015,625.0 V)	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	> 96.0 %	(Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed	≥ 15,000 s > 841,015,625.0 V)	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	Engine outlet coolant temperature drops below for an unexpected reason	≤ 709,000,015,258,788.0 Deg C	Diagnostic is Enabled No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature ************************* Engine coolant temperature At least once during the key cycle ************************* Heat to coolant DFCO time RPM Active Fuel Management	 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 ≥ 20.0 seconds ≥ 2.0 km ≥ 55.0 kPa ≥ -9.0 Deg C ≥ 709,000,015,258,789.0 Deg C ≥ **P01F0 - Heat To Coolant Min 2D** ≤ 0.0 seconds ≤ 8,192	48 seconds out of a 60 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is not in Actual flow rate Engine flow rate	Half Cylinder Mode < 70.00 < 80.00		

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: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] x **P0234: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -20.00 [°C] AND < 55.00 [°C] > -5 [kPa/s] AND < 5 [kPa/s] > 2,000.00 [rpm] AND < 3,000.00 [rpm]	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			
					Desired intake Boost pressure in range	> **P0234: Minimum boost pressure for overboost monitor enabling** [kPa] AND < **P0234: Maximum boost pressure for overboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60 [°C] ==TRUE < 130 [°C]		
					Ambient Air Pressure in range	> 695,999,984,741,211 [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: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control not active)** [kPa] x **P0299: Underboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -20.00 [°C] AND < 55.00 [°C] > -5 [kPa/s] AND < 5 [kPa/s]	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.
		limits.			Engine speed in range	> 800.00 [rpm] AND < 3,000.00 [rpm]		
					Desired intake Boost pressure in range	> **P0299: Minimum boost pressure for underboost monitor enabling** [kPa] AND < **P0299: Maximum boost pressure for underboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60 [°C] ==TRUE < 130 [°C]		
					Ambient Air Pressure in range	> 695,999,984,741,211 [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		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected	P0300 P0301 P0302 P0303	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The pattern of misfire is taken into account to select the proper misfire thesholds.. Additionally, the pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise such as rough road. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab > **RufSCD_Decel** AND > **RufSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **RufCyl_Decel** AND > **RufCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -9 ºC < ECT Or if OBD Max Coolant Achieved = TRUE -9 ºC < ECT < 129 ºC < -9 ºC If OBD Max Coolant Achieved = FALSE 21 ºC < ECT If OBD Max Coolant Achieved = TRUE 21 ºC < ECT < 129 ºC 9.00 < volts < 319,990,234,375.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (4) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper between engine and transmission can go into extreme resonance. Default action is to move rpm out of the resonance zone. If default action not activated, significant hardware damage could occur rendering vehicle inoperable.	****************************** **This Feature only used on Diesel engines** Combustion Modes that force selection of Idle Tables ****************************** Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk)	************************** **This Feature only used on Diesel engines** **CombustModeIdleTbl** in Supporting Tables ************************** > 3 Engine Cycles > **RufSCD_Decel** * **Random_SCD_Decel** >**RufSCD_Jerk** * **Random_SCD_Jerk** > **SCD_Decel** * **Random_SCD_Decel** > **SCD_Jerk** * **Random_SCD_Jerk** > **RufCyl_Decel** * **RandomCylModDecel** > **RufCyl_Jerk** * **RandomCylModJerk**			any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	> **RufSCD_Decel** * **ConsecSCD_Decel** > **RufSCD_Jerk** * **ConsecSCD_Jerk** > **SCD_Decel** * **ConsecSCD_Decel** > **SCD_Jerk** * **ConsecSCD_Jerk** > **RufCyl_Decel** * **ConsecCylModDecel** > **RufCyl_Jerk** * **ConsecCylModeJerk** > **CylModeDecel** * **ConsecCylModDecel** > **CylModeJerk** * **ConsecCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CYLINDER DEACTIVATION MODE (Active Fuel Managment) 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	 > **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**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CylBeforeDeacCyl_Jerk)	> **CylModeJerk** * **ClyBeforeAFM_Jerk** * **RandomAFM_Jerk**				
			OR IF option Crank based IMEP estimate is Enabled and CrankBased_IMEP is	Not Enabled < **Misfire_IMEP_Thresh _vs_BinID** (Note: Thresholds uses following tables to pick threshold vs BinID. See supporting tables for more information on how BinID works to select appropriate calibration threshold) **Misfire_IMEP_BinID_ vs_RPM_Load** **Misfire_IMEP_BinID_ RPM_Axis** **Misfire_IMEP_BinID_ Load_Axis** - see details on Supporting Tables Tab				
			Misfire Percent Emission Failure Threshold	≥ 38,125.00 % P0300				
			Misfire Percent Catalyst	>				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Damage	**Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 8,191 rpm AND > 1,989,990,234,375 % load		
					Engine Speed	510 < 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 MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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	> 8,191,875 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** or <**ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	≤ 100.0 % (≤ 100.0 % in AFM) > 3,181,371,958 mph (> 3,181,371,958 mph AFM)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative:			
					DeactivatedCyl_Decel AND		0 cycle delay	
					DeactivatedCyl_Jerk AND	<**DeacCylInversionDecel**		
					# of Deact Cyls Inverted	<**DeacCylInversionJerk**		
						> 4 cylinders		
					Manual Trans		4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	Clutch shift	4 cycle delay	
						> 970,001,220,703,125.00 %		
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTO engaged		4 cycle delay	
					Delay if error in indices of buffered data is detected and delay is enabled	Enabled	3 cycle delay	
					Delay if IMEP calculation	Delay Enabled	4 cycle delay	
					****************************** **This Feature only used on Diesel engines**	initializing on startup or running resets (expires before rpm enablement)	*******************	
					Combustion Mode	******************************	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Driver cranks before Wait to Start lamp extinguishes	= **InfrequentRegen** value in Supporting Tables	**WaitToStart** cycle delay	
					Brake Torque ******************************	IF TRUE	4 cycle delay ******************	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.	> 199,993,896,484,375.00 % Max Torque ******************************		
					Filter Driveline ring:	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	> "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).)			
					Used Off Idle, and while not shifting,			
					TPS	> 1,989,990,234,375 %		
					Engine Speed	> 1,000 rpm		
					Veh Speed	> 3 mph		
					Auto Transmission	not shifting		
					indivdual candidate deemed abnormal if number of consecutive decelerating			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles. abnormal candidates/ total candidates MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles.	> **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables > 5.00 ratio	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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		
					Pattern Recog Enabled consecutive cyl pattrn	Not Enabled		
					Engine Speed Veh Speed	Enabled		
					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.	580 < rpm < 6,800 > 0.0 mph		
					(CylAfter_Accel AND CylAfter_Jerk)	> Misfire_ decel ***** **1st_FireAftrMisfr_Acel** > Misfire_Jerk ***** **1st_FireAftrMisfr_Jerk**		
					Addtionally, the crankhaft is checked again a small	Or if AFM mode is active: > Misfire_ decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk *		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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.	**1stFireAfterMisJerkAFM**		
					Num of Cylinders after misfire to start check of crankshaft snap			
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	3 Cylinders		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire**		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					Ratio of Unrecog/Recog		discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					****************************** NON-CRANKSHAFT BASED ROUGH ROAD: Rough Road Source ****************************** IF Rough Road Source = WheelSpeedInECM (Wheel speed noise OR ABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "FromABS" (RoughRoad = OR ABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "TOSS" TOSS dispersion	> 5,999,755,859,375.00 ****************************** Disabled CeRRDR_e_None ****************************** > **WSSRoughRoadThres** active active active ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status ****************************** detected active active active ABS Failed Vehicle Dynamics Control System Status ****************************** >**TOSSRoughRoadThres**	******************* ******************* discard 100 engine cycle test ******************* discard 100 engine cycle test ******************* discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND No Active DTCs	in supporting tables		
						Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)	4 cycle delay	
					****************************** Default Action		*******************	
					Isolator Resonance Default Action Option ******************************	******************************		
					If Isolator Resonance Option Enabled AND Misfire P030x TFTKO	Not Enabled ****************************** Set engine speed limits: 0 < Eng RPM < 9,000	*******************	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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:	> 10,000,000,474,974,500.000 degrees	OBD Manufacturer Enable Counter	MEC = 0	5.00 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 1.0 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 2.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 4.0 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 15.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 19.0 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow insufficient (Model Based)	P0401	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower HP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the HP EGR flow monitor is to detect HP EGR obstructions (insufficient HP EGR flow). The HP EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, HP EGR cooler (if present) outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBD limits.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	< 0	Calibration on diagnostic enabling	**P0401: Insufficient HP EGR flow monitor enabling** ==TRUE	Residual error average over 200.00 sample counters:	Type B, 2 Trips
					Engine Running	==TRUE	sampling time is 25 ms	
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Desired EGR rate	> 0 [%]		
					Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 10 [rpm], FALSE if > 19.00 [rpm]		
					for a minimum number of samples	> 20 [counts]		
					Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 5.00 [mm^3], FALSE if > 1,100,000,023,841,860.0 0 [mm^3]		
					for a minimum number of samples			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR flow request is steady state: |HPFLOW-HPFLOW_old| in range, with hysteresis for a minimum number of samples No active transition from a combustion mode to another one Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Desired HP EGR flow Desired fuel quantity	> 20 [counts] TRUE if <= 25.00 [mg], FALSE if > 40.00 [mg] > 20.00 [counts] ==TRUE > -23.00 [°C] > 695,999,984,741,211.00 [kPa] > 60.00 [°C] ==TRUE > **P0401: Minimum desired HP EGR flow** [mg]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						> **P0401: Insufficient HP EGR flow Min fuel enabling condition** [mm^3] AND < **P0401: Insufficient HP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402, P049B, P049C: Outside air temperature" Free Form		
					Desired LP EGR split	< 1.00		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last for a time	>= 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow Excessive (Model Based)	P0402	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to higher HP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the HP EGR flow monitor is to detect HP EGR leakages (excessive HP EGR flow). The HP EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, HP EGR cooler (if present) outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to a leakage) that leads to exceed the OBD limits.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	> 0	Calibration on diagnostic enabling	**P0402: Excessive HP EGR flow monitor enabling** ==TRUE	Residual error average over 200.00 sample counters:	Type B, 2 Trips
					Engine Running	==TRUE	sampling time is 25 ms	
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Desired EGR rate	> 0 [%]		
					Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 10 [rpm], FALSE if > 19.00 [rpm]		
					for a minimum number of samples	> 20 [counts]		
					Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 5.00 [mm^3], FALSE if > 1,100,000,023,841,860.0 0 [mm^3]		
					for a minimum number of samples			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR flow request is steady state: |HPFLOW-HPFLOW_old| in range, with hysteresis for a minimum number of samples No active transition from a combustion mode to another one Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Desired HP EGR flow Desired fuel quantity	> 20 [counts] TRUE if <= 25.00 [mg], FALSE if > 40.00 [mg] > 20.00 [counts] ==TRUE > -23.00 [°C] > 695,999,984,741,211.00 [kPa] > 60.00 [°C] ==TRUE **P0402: Maximum** <**desired HP EGR flow** [mg] >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0402: Excessive HP EGR flow Min fuel enabling condition [mm^3] AND < **P0402: Excessive HP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402, P049B, P049C: Outside air temperature" Free Form		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last for a time	>= 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**	Monitor Enable Condition AND DIagnosis System Disabled AND Ignition In Range AND Run Crank Time AND Engine Crank Low Time Error	1.00 == == FALSE == TRUE > 28,800.00 == TRUE == FALSE	Cumulative EGR Flow <= 4,000.00 Function Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	< 10.00 [Ω]	Monitor Enable Condition AND System supply voltage AND Ignition In Range AND Engine Mode Crank AND Diagnosis System Disabled	1.00 == TRUE > 11.00 == TRUE == TRUE == FALSE == FALSE	16 failures out of 25 samples Function Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Monitor Enable Condition AND System supply voltage AND Ignition In Range AND Engine Mode Crank AND Diagnosis System Disabled	1.00 == TRUE > 11.00 == TRUE == TRUE == FALSE == FALSE	16 failures out of 25 samples Funtion Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Monitor Enable Condition AND Ignition In Range AND System supply voltage AND Diagnosis System Disabled AND Engine Mode Crank	1.00 == TRUE == TRUE > 11.00 == TRUE == FALSE == FALSE	20 failures out of 30 samples Function task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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**	Monitor Enable Condition Diagnosis System Disable AND RunCrankIgnInRange RunCrankLow for a calibratable time AND RunCrankLowTimeErr	1.00 == FALSE ==TRUE >= 28,800.00 == TRUE == FALSE	Function Task: 100 ms/sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Low	P041C	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes.The monitor compares the EGRT raw value (resistance value or a temperature value in case of digital sensor) with a minimum threshold.	**Analog Sensor:** The monitor compares the EGRT 1 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGRT 1 raw value (temperature value) with a minimum threshold;	< 10.00 [Ω] < -7,280,000,305,175,780.00 [°C]	Monitor Enable Condition AND RunCrankIgnInRange AND Egine Mode Crank AND Diagnosis System Disabled AND RunCrankActive NAC10 Fault	1.00 == TRUE == FALSE == FALSE == TRUE == FALSE	16 failures out of 25 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt High	P041D	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes.The monitor compares the EGRT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog Sensor:** The monitor compares the EGRT 1 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR Hgh error is detected. **Digital termocouple sensor:** The monitor compares the EGRT 1 raw value (temperature value) with a maximum threshold	> 860.00 [Ω] > 12,898,499,755,859,400.00 [°C]	Monitor Enable Condition AND RunCrankIgnInRange AND Egine Mode Crank AND Diagnosis System Disabled AND RunCrankActive NAC10 Fault	1.00 == TRUE == FALSE == FALSE == TRUE == FALSE == FALSE == FALSE	16 failures out of 25 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	1.00 The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	==TRUE than DiffTemp > 100.00 else DiffRes> 190.00	Monitor Enable Condition AND RunCrankIgnInRange AND RunCrankActive AND Diagnosis System Disabled AND Engine Mode Crank	1.00 == TRUE == TRUE == FALSE == FALSE	20 failures out of 30 samples Function Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Warm Up Catalyst Efficiency Below Threshold Bank 1	P0421	The Catalyst (CC DOC) monitor only runs during DPF regeneration and compares the CC DOC released oxidation heat and the post-injected fuel quantity both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that post-injection is enabled during CC DOC monitor in order to produce enough exothermic heat across the Catalyst to evaluate the component conversion efficiency in a reliable way.	Catalyst Aging Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Aging Index < Repass Threshold If the rich combustion monitor has been enabled (refer to 'P0421 - Warm Up Catalyst Efficiency Below Threshold Bank 1 (OBD2, Rich combustion based monitor)' section of this document) together with the DPF regeneration portion AND If the DOC heat up phase, identified by the condition of DOC downstream temperature greater than a calibratabe threhsold during DPF regeneration for a minimum calibratable debounce time, can not be reached AND The DPF regeneration monitor portion has run	Aging Index < 3,709,000,051,021,580.00 [value] If EWMA Enbl Cal = 1.00 [Boolean] AND Catalyst FA = CAT_CatSysEffLoB1_FA Then: Aging Index < 3,709,000,051,021,580.00 [value] Catalyst monitor slection = CeCATD_e_RgnCatMontr Combustion mode = DPF regeneration AND NOT(DOC downstream temperature >	Rich combustion based monitor with DPF regeneration portion OR DPF regeneration based monitor enabled AND No active DTCs: AND - Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND - Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; Catalyst monitor status is DISABLED if: - DPF regeneration disabled OR	Catalyst monitor slection = CeCATD_e_RgnCatMontr AND ReportingEnabled= 1.00 [Boolean] AND Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt); Samples nr. = 10.00 [Counter]; Catalyst monitor status is DISABLED if: DPF_DPF_St = SootLoading [Enumerative] OR	Task Time = 100 [ms] If - Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Catalyst (CC DOC) monitor.	reporting a test FAIL, then this latter is considered to make a report, converting the test result through a dedicated map (to bring in the same range of the rich combustion based monitor) and comparing it with the same threshold mentioned above.	<KeCATD_T_RMD_RgnMinTemp> for at least <KeCATD_t_RMD_RgnMinTempDebTm> [°C]) DPF regeneration test fail if test result < 0.00 DPF regeneration portion test result converted through **DPFtoRichConversion**	- Injection system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE) OR Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; Catalyst monitor status	Injection System Flt = FUL_GenericInjSysFlt OR Amb Temp FA = CAT_OutsideTempFA OR Cat Up Exh Flow Flt = EXF_TotExhCatUpFlt OR Amb Press < 699,000,015,258,789.00 [KPa] OR Amb Temp < 253.00 [K] OR Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean];	If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					can move from DISABLED to TRIGGERED if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND	Catalyst monitor status can move from DISABLED to TRIGGERED if: DPF_DPF_St ≠ SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K]	- EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 1 trip (with no mulfunction) to report pass - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Catalyst up exhaust temperature (by sensor) lower than calibration AND HC unloading disabled; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and post injected fuel integrator are both	AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 120.00 [°C] AND Cat Up Temp Snsr < 973.00 [K]; AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean]; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enabled) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in	post injected fuel integrator are both enabled) if: DPF_DPF_St ≠ SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND - Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Catalyst up exhaust temperature (by sensor) higher than calibration AND - Post injection enabled AND - Catalyst up exhaust flow estimation in range AND - Catalyst up exhaust temperature (by sensor) in range AND - Post injection fuel rate in range AND - Consecutive time in which Post Injection Fuel rate is lower than a threshold is less than a calibration AND HC unloading disabled;	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 0.00 < Cat Up Exh Flow < 450.00 [g/s] AND 400.00 < Cat Up Temp Snsr [K] < 810.00 AND 9,999,999,776,482,580.0 0 < Post Inj Fuel Qnty [g/s] < 10.00 AND Post Inj Fuel Qnty [g/s] < 0.00 for less than 0.00 [s] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oxidation heat release integrator and post injected fuel integrator are both frozen if: - Engine not running OR - Catalyst up exhaust flow estimation out of range OR - Catalyst up exhaust temperature (by sensor) out of range OR - Post injection fuel rate out of range OR - Consecutive time in which Post Injection Fuel rate is lower than a threshold is more than a calibration Catalyst monitor status can move from ENABLED	Oxidation heat release integrator and post injected fuel integrator are both frozen if: - Engine not running OR Cat Up Exh Flow [g/s] < 0.00 OR Cat Up Exh Flow > 450.00 [g/s] OR Cat Up Temp Snsr [K] < 400.00 OR Cat Up Temp Snsr [K] > 810.00 OR Post Inj Fuel Qnty [g/s] < 9,999,999,776,482,580.0 0 OR Post Inj Fuel Qnty [g/s] > 10.00		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Integrated post injected fuel quantity higher than curve AND HC unloading disabled	Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND - Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Open (Output Driver Monitor) (Not used on EREV/ PHEV/ HEV)	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 ≥ 11.0 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0691 may also set (Fan 1 Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan System Performance [EV Engine Driven Fans Only]	P0483	The fan diagnostic is performed when the fan clutch is commanded ON. The fan is considered ON when the fan control PWM output duty cycle is greater than a calibration. A failure is indicated if there is a large difference between the actual fan speed and the commanded speed. This is a type "B" diagnostic that uses an Exponentially Weighted Moving Average [EWMA] approach with weighting factors based on operating conditions. Before the diagnostic reports a PASS or FAIL, all the weighting factors combined must exceed a calibration indicating enough reliable data has been collected.	Fan speed weighted filtered residual speed (measured - commanded) must be above the lower threshold and below the upper threshold	less than -700 rpm and greater than 700 rpm	a] Diagnostic Enabled b] Fan commanded on c] Fan at min duty cycle d] Intake Air Temp Fault Active e] Enginer Arbitrated Fault Active f] Output Driver Fault Active g] Fan Speed Sensor Circuit Fault Active h] Intake Air Temperature i] System Voltage j] Ambient Air Pressure defaulted k] Ambient Air Pressure l] Outside Air Temperature m] Fan Drive Speed (input shaft speed) n] Fan rate of speed change o] Engine coolant temperature	1.00 [True if 1; False if 0] b] =TRUE c] d] = FALSE e] = FALSE f]= FALSE g]= FALSE h] >= -20.00 deg C i]>= 11.00 V j]= FALSE k] > 74.00 kPa l] >= -20.00 deg C m] >= 400 & <= 5,320 rpm n] < 2,000.00 rpm/sec o] >= 69 deg C	When the filtered total weighting factor (see tab P0483 Weighted Filtered Factor) exceeds 600,006,103,515,625.00 the diagnostic is ready to report	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 [EV Engine Driven Fans Only]	P0495	The purpose of this diagnostic is to detect a clutch that is providing too much engagement. The measured fan speed is compared to a drag speed table based on input shaft speed. A failure will be indicated if the measured fan speed is above the drag speed in the table for a calibrated number of samples. This is a type "B" diagnostic that uses a X/Y approach	Measured fan speed must be less than the speed high limit (drag speed)	>= Speed High Limit [Supporting Table] **P0495 Threshold [EV Fans Only]**	a] Diagnostic Enabled b] Fan speed c] Clutch Pumped Out d] Intake Air Temp Fault Active e] Enginer Arbitrated Fault Active f] Output Driver Fault Active g] Fan Speed Sensor Circuit Fault Active h] Intake Air Temperature i] System Voltage j] Ambient Air Pressure defaulted k] Ambient Air Pressure l] Fan Commanded off	a =] 1 [True if 1; False if 0] b] >= 1,600 rpm c] = TRUE d] = FALSE e] = FALSE f]= FALSE g]= FALSE h] >= -20.00 deg C i]>= 11.00 j] = FALSE k > 74.00 i) = TRUE	800 failures out of 1,000 samples	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 3,000,000,026,077,030.00000	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 ≥ 30 sec 32 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 1.24 mph, 2kph ≤ 25 rpm > 5 sec > 67,999,267,578,125.00 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		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Engine Speed Idle System	P0507	This DTC 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 Filter coefficient	< -182.00 rpm 3,000,000,026,077,030.00000	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa > 60 °C ≥ 30 sec 32 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 1.24 mph, 2kph ≤ 25 rpm > 67,999,267,578,125.00 pct < 25.00 pct PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must	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.
						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 FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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.
System Voltage Low	P0562	Detects a low 12V battery system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value.	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Enable Starter motor criteria met (Starter motor not engaged) Enable engine speed criteria met (Engine speed higher than) Enable run crank criteria met	1.00 1.00 1.00 >= 400.00 1.00	400 failures out of 500 samples 12.5 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

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

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)	P060C	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 5.0 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 204,796,875 ms continuous, 5.0 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 33,535.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 5.0 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 33,535.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 5.000 sec	10 / 40 counts; 25.0msec/count	
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 46,478,125 ms continuous, 5.0 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 46,478,125 ms continuous, 5.0 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1,100,000,023,841,860.00 T/C Range Hi 10,000,000,149,011,600.00 T/C Range Lo Low Threshold: 1,100,000,023,841,860.00 T/C Range Hi 10,000,000,149,011,600.00 T/C Range Lo	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 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)** + 1,230,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 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 204,796,875 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	1,220,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 16,478,125 ms continuous, 5.0 down time multipier	
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	1,230,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 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 204,796,875 ms continuous, down time multipier 5.0	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 5.0 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	1,230,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 16,478,125 ms continuous, 5.0 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 16,478,125 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Minimum value (**P16F3_Speed Control External Load f(Oil Temp, RPM)** , **P16F3_Speed Control External Load Max f (Vehicle Speed, RPM)** + **P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 1,230,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Minimum value (**P16F3_Speed Control External Load f(Oil Temp, RPM)** , **P16F3_Speed Control External Load Max f (Vehicle Speed, RPM)** + **P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				) + 1,230,999,984,741,21 0.00 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	33,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	33,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	1,257,562,484,741,210.00 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	1,220,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	5,505,027,465,820,31 0.00 m/s	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 16,478,125 ms continuous, 5.0 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 19,203,125 ms continuous, 5.0	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 1,230,999,984,741,21 0.00 Nm Low Threshold - 1,230,999,984,741,21 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 4,625 ms continuous, 5.0 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 35.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 4,625 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Generator friction torque is out of bounds given by threshold range	High Threshold 1,230,999,984,741,210.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 19,203,125 ms continuous, 5.0 down time multipier	
			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	1. 1,220,999,984,741,210.00 Nm 2. N/A 3. 1,220,999,984,741,210.00 Nm 4. 1,220,999,984,741,210.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 1,230,999,984,741,210.00 Nm 3. & 4.: Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			4. Reserve engine torque above allowable capacity threshold					
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 5.0 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	33,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 5.0 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated	Table, f(Oil Temp, RPM, Vehicle Speed). See supporting tables:	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			limit.	min (**P16F3_Speed Control External Load f(Oil Temp, RPM)** , Sum **old P16F3_Speed Control External Load Max f(Vehicle** (**Speed, RPM)** , **old P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 1,230,999,984,741,210.00 Nm			5.0 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	1,257,562,484,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 1,625 ms continuous, 5.0	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							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 OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1. 35,003,662,109,375.0 0 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475.00 475.00 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded axle torque is greater than its redundant calculation by threshold	33,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	503,025.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			AC friction torque is greater than commanded by AC control software	50.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 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, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 5.00 s	16 / 32 counts; 25.0msec/count	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 down time multipier	
			Calculated or Commanded Engine to Axle ratio is lower than a threshold -OR- Engine to Axle Offset is greater than a threshold	0.9 4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175.00 ms continuous, 5.0 down time multipier	
			Difference between Cruise Arbritration Request and its redundant calcultion exceeds a threshold -OR- Difference between	1,257,562,484,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 500.00 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cruise Accleration Request and its redundant calcultion exceeds a threshold	5,000,000,074,505,81 0.00 KPH/Second				
			Difference between commanded Engine Torque and its redundant calcultion is greater than a threshold -OR- Difference between commanded Engine Torque and its redundant calcultion is less than a threshold	4,096.00 Nm 503,025.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 204,796,875.00 ms continuous, 5.0 down time multipier	
			Requested fuel mass is greater or equal to its redundant calculation plus threshold	8,248,218,536,376,95 0.00 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 46,478,125.00 ms continuous, 5.0 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	1,230,999,984,741,21 0.00 Nm 1,230,999,984,741,21 0.00 Nm	Engine running		Up/down timer 4,625.00 ms continuous, 5.0 down time multiplier	
			High Pressure Pump Torque Load is greater than threshold	1,230,999,984,741,21 0.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 5.0	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR High Pressure Pump Torque Load is lower than threshold	0.00 Nm			down time multiplier	
			Pumping Losses is lower than threshold OR Pumping Losses rate of change signal greater than P2D2 threshold	0.00 Nm/task_100ms 15,387,499,809,265,100.00 Nm	Engine running		Up/down timer 4,625.00 ms continuous, 5.0 down time multiplier	
			Start Up Engine Friction Compensation rate of change haher than a threshold AND Start Up Engine Friction Compensation higher than threshold	615.00 Nm/task_12.5 131.00 Nm	Engine running		Up/down timer 7,840,625.00 ms continuous, 5.0 down time multiplier	
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	1,230,999,984,741,210.00 Nm	Engine running		Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	
			Active damping torque reduction greater than threshold OR Active damping torque reduction lower than threshold	1,230,999,984,741,210.00 Nm -1,230,999,984,741,210.00	Engine running		Up/down timer 16,478,125.00 ms continuous, 5.0 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			Fuel volume request greater than its redundant calculation plus threshold	9,715,216,636,657,720.00 mm3	Engine running No rich combustion mode		Up/down timer 46,478,125.00 ms continuous, 5.0 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	9,715,216,636,657,720.00 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 16,478,125.00 ms continuous, 5.0 down time multiplier	
			Cumulative Programmed Energizing Time greater then its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	8,907,947,540,283,200.00 us additional value for emission tests: 0.00 us additional value fro CSERS test <KeFULC_t_CSERS_DeltSafetyDB> us	Engine running		Up/down timer 16,478,125.00 ms continuous, 5.0 down time multiplier	
			Cumulative Desired Energizing Time greater than its redundant calculation plus threshold (Note: when an emission test is performed OR	8,907,947,540,283,200.00 us	Engine Running		Up/down timer 16,478,125.00 ms continuous, 5.0 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 <KeFULC_t_CSERS_ DeltSafetyDB> us				
			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	188,025.00 MPa/s -358,225.00 MPa/s	Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	
			Absolute difference between Main Correction and its redundant calculation greater than or equal to threshold	9,715,216,636,657,72 0.00 mm3	Engine running No rich combustion mode		Up/down timer 16,478,125.00 ms continuous, 5.0 down time multiplier	
			Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than its redundant calculation plus threshold OR (only if cylinder balancing	**P16F3_CB safety deadband threshold f (Fuel Rail Pressure)** us	Engine running		Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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				
			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 16,478,125.00 ms continuous, 5.0 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	9,715,216,636,657,720.00 mm3	Engine cranking or engine running		Up/down timer 16,478,125.00 ms continuous, 5.0 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 46,478,125.00 ms continuous, 5.0 down time multiplier	
			Oil Pump Low Pressure Offset Friction greater then zero OR Oil Pump Low Pressure Offset Friction lower then threshold	-20.00 Nm	Engine running		Up/down timer 4,625.00 ms continuous, 5.0 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Rate of change on fuel mass compensaton for coolant temperature greater than P2D2 threshold	4,124,109,649,658,20 0.00 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	
			Rate of change on fuel mass compensaton for air temperature greater than P2D2 threshold	4,124,109,649,658,20 0.00 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	
			Absolute value of fuel mass compensated for vehicle speed greater than threshold	4,124,109,268,188,48 0.00 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 16,478,125.00 ms continuous, 5.0 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 46,478,125.00 ms continuous, 5.0 down time multiplier	
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	1,230,999,984,741,21 0.00 Nm	Engine running		Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 7,840,625.00 ms continuous, 5.0 down time multiplier	
			rate of change on pumping losses friction due to exhaust brake actuation higher than rate limit OR Pumping losses friction outside min/max authority	Rate of change limit: 0.00 Nm Min: 0.00 Nm Max: 191.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 5.0 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, 5.0 down time multiplier	
			Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Previous Combustion Mode Arbitration Winner is higher than the maximum expected		Engine cranking or engine running		Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			combustion mode OR Combustion Mode Arbitration Winner is equal to Previous Combustion Mode Arbitration Winner and not equal to Normal combustion Mode					
			The sum of Low, Middle and High Barometric Correction Factors greater than 1		Engine cranking or engine running		Up/down timer 196,478,125.00 ms continuous, 5.0 down time multiplier	
			Energizing Time correction for Injector Body Temperature greater then threshold	**P16F3_IBT safety deadband threshold f (Fuel Rail Pressure)**	Engine Cranking or engine runnig		Up/down timer 46,478,125.00 ms continuous, 5.0 down time multiplier	
			cumulative DT absolute difference beetween secured DT and Programmed DT greater than threshold (torque forming pulses only)	50.00 us	Engine Cranking or engine runnig		Up/down timer 200.00 ms continuous, 5.0 down time multiplier	
			cumulative SOI absolute difference beetween secured SOI and Programmed SOI greater	2.00 Degrees	Engine Cranking or engine runnig		Up/down timer 200.00 ms continuous, 5.0	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			than threshold (torque forming pulses only)				down time multiplier	
			Absolute value of the difference between the calculated EIA (VSI specific) compensation and its redundant calculation greater than threshold	**P16F3_EIA VSI safety deadband threshold f (Fuel Rail Pressure)**	Engine cranking or engine running		Up/down timer 200.00 ms contiuous, 5.0 down time multiplier	
			Fuel mass compensated for exhaust gas tempearture outside min/max autorithy	-41,341,094,970,703, 100.00 mg 41,341,094,970,703,1 00.00 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 500.00 ms continuous, 5.0 down time multiplier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: **P060C_Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 204,796,875 ms continuous, 5.0 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	1,230,999,984,741,210.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 5.0 down time multipier	

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 Engine speed Run Crank voltage	Enabled >= 0.00 RPM >= 11.00 volts	40 failures out of 50 samples 50 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Engine speed Run Crank voltage	Enabled >= 0.00 RPM >= 641,015,625.00 volts	8 failures out of 10 samples 50 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Enabled >= 0.00 RPM >= 641,015,625.00 volts	40 failures out of 50 samples 50 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > (100% corresponds to 5.5 Volt)	8,863,677,978,515,630.00 % Vref1 93,182,373,046,875.00 % Vref1 9,002,685,546,875.00 % Vref1	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 641,015,625.00 Volts = 25.00 Seconds = FALSE > 841,015,625.00 Volts = TRUE	19 / 39 counts; or 1,875.0000 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 #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 > (100% corresponds to 5.5 Volt)	8,863,677,978,515,630.00 % Vref2 93,182,373,046,875.00 % Vref2 9,002,685,546,875.00 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 641,015,625.00 Volts = 25.00 Seconds = FALSE > 841,015,625.00 Volts = TRUE	19 / 39 counts; or 1,875.0000 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.
Control Module Power Relay Control Circuit	P0685	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 K Ω ohms impedance between output and controller ground	Powertrain relay Open circuit diagnostic diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Control Circuit Low Voltage	P0686	Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: ≤ 0.5 Ω impedance between output and controller ground	Powertrain relay Low Side driver short to ground diagnostic diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Control Circuit High Voltage	P0687	Detects a short to power in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to power failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: ≤ 0.5 Ω impedance between output and controller power	Powertrain relay Low Side driver short to power diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 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 High Voltage	P0690	Detects higher than expected voltage in the powertrain relay feedback circuit. This diagnostic reports the DTC when higher than expected voltage is present. For example, the powertrain relay could be stuck on. Monitoring occurs when the relay is commanded "off" for a calibrated duration.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay high voltage feedback circuit diagnostic enable = TRUE Powertrain relay commanded “OFF” No active DTCs:	1.00 >= 2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Low Voltage (Output Driver Monitor)	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 ≥ 11.0 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage	Voltage ≥ 11.0 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or too high or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref3 < or ECM percent Vref3 > or the difference between ECM filtered percent Vref3 and percent Vref3 > (100% corresponds to 5.5 Volt)	8,863,677,978,515,630.00 % Vref3 93,182,373,046,875.00 % Vref3 9,002,685,546,875.00 % Vref3	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 641,015,625.00 Volts = 25.00 Seconds = FALSE > 841,015,625.00 Volts = TRUE	19 / 39 counts; or 1,875.0000 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 > (100% corresponds to 5.5 Volt)	8,863,677,978,515,630.00 % Vref4 93,182,373,046,875.00 % Vref4 9,002,685,546,875.00 % Vref4	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 641,015,625.00 Volts = 25.00 Seconds = FALSE > 841,015,625.00 Volts = TRUE	19 / 39 counts; or 1,875.0000 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.
Fuel Pump Driver Control Module System Voltage Performance (Only on applications that use an FTZM)	P1002	Detects low system voltage performance of the fuel pump driver control module system. This diagnostic reports the DTC when the absolute value of the difference between the fuel pump driver battery voltage and the fuel pump driver run/crank voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Run Crank voltage low and high	ABS (Fuel Pump Driver Control Module Battery voltage - Fuel Pump Driver Control Module Run Crank voltage) > 3.00	Fuel Tank Zone Module (FTZM) is present on vehicle		100 failures out of 125 samples 12.5 ms / sample	Type B, 2 Trips
					Fuel Pump Driver Control Module System Voltage Performance diagnostic is enabled	= 1		
					Fuel Tank Zone Module (FTZM) serial messages are available			
					FTZM Run Crank Active is TRUE			
					Starter motor not engaged			
					Sensor Bus relay is commanded ON			
					Sensor Bus Relay FA = False	SensorBusRelayFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Ignition Switch Run/ Start Position Circuit High (Only on applications that use an FTZM)	P1007	Detects high voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit high	FTZM Run Crank Active is TRUE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON Sensor Bus Relay FA = False	= 1 = FALSE SensorBusRelayFA	200 failures out of 250 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Injector Temperature - Exhaust Gas Temperature Not Plausible	P10D1	This monitor measures the coil temperature of the DEF injector, and compare it to with reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	> **P10D1_CoilTempRatTempRef**	Test enabled by calibration (TRUE->Enable False -> Disable) DEF Injector Fault State (No fault on injector) Powertrain relay in range Long Engine off soak period has elapsed (sec) Service Test Run/Crank is Active Engine in Cranking Phase Powertrain Relay in-Range Diag System Disable This diagnosti has already run and completed Coil Temperature Estimation Available	1.00 == FALSE == TRUE >= 28,800.00 == FALSE == TRUE == FALSE == TRUE == FALSE == FALSE == TRUE	Single decision criteria. Function Task: 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Multiple Pressure Sensor Correlation Performance (3 intake air pressure sensor configuration)	P1199	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 engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO, MAP and TCIAP sensors values are checked to see if they are within the normal expected atmospheric pressure range. If they are, then BARO, MAP and TCIAP are compared to see if their values are similar. If the three sensors are	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, P1199: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P1199: 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 ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms for applications without LIN MAF sampling time is 25 ms for applications with LIN MAF	Type A, 1 Trips

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

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)	< 4.0 %	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed Diagnostic feedback protocol is not in the *check low state*	= CeFHPG_e_RPS_Double Track ≥ 15,000 s > 841,015,625.0 V	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	> 96.0 %	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed Diagnostic feedback protocol is not in the *check high* state	= CeFHPG_e_RPS_DoubleTrack ≥ 15,000 s > 841,015,625.0 V	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Sensor Bus Relay FA = False	 = 1 = TRUE SensorBusRelayFA	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.
HP EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140B: Increasing HP EGR slow response threshold** [%]	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one (Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 5.00 [s] > 0 [%] ==TRUE > 30.00 [°C] ==TRUE < 129.00 [°C] > 85.00 [%]	Test is evaluated after the enabling conditions are satisfied for a number of samples >= 200.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Throttle measured position			
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 695,999,984,741,211.00 [kPa]		
					LP EGR valve total mass error (absolute value, |desired LP EGR mass - estimated LP EGR mass|)	< 1.00 [mg]		
					Desired fuel quantity in range	> **P140B: Increasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140B: Increasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 450.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold	< 25.00 [mg/s]		
					Desired HP EGR flow gradient (Req-ReqOld)	TRUE if >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					greater than a threshold, with hysteresis Hysteresis lasts for a limited number of samples HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis Desired HP EGR rate HP EGR valve position OR it is above that threshold for a time Exhaust manifold pressure is valid Nominal HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	1,899,999,976,158,140.00 [mg], FALSE if < 699,999,988,079,071.00 [mg] <= 45.00 [count] TRUE if > 45.00 [mg], FALSE if < 15.00 [mg] > 7.00 [%] <= 55.00 [%] >= 5.00 [s] EXM_ExhMnfdPresNotVld ==FALSE EGR_VlvTotFlowNomNotVld ==FALSE LPE_VlvTotFlowNomNotVld ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						>= 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HP EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140C: Decreasing HP EGR slow response threshold** [%]	Calibration on diagnostic enabling	**P140B, P140C: HP EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>= 200.00 sampling time is 25ms	
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 5.00 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 30.00 [°C] ==TRUE < 129.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Throttle measured position	> 85.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 695,999,984,741,211.00 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 1.00 [mg]		
					Desired fuel quantity in range	> **P140C: Decreasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140C: Decreasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 450.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) greater than a threshold	> -2,299,999,952,316,280.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold, with hysteresis Hysteresis lasts for a limited number of samples HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis Desired HP EGR rate Exhaust manifold pressure is valid Nominal HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	[mg/s] TRUE if < -1,899,999,976,158,140.00 [mg], FALSE if > -699,999,988,079,071.00 [mg] <= 45.00 [count] TRUE if < -45.00 [mg], FALSE if > -15.00 [mg] < 55.00 [%] EXM_ExhMnfdPresNotVld ==FALSE EGR_VlvTotFlowNomNotVld ==FALSE LPE_VlvTotFlowNomNotVld ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						> 1.00 [s]		

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 > 27,399,999,618,530,300 C	Monitor Enable Condition AND Engine soak (not run) time AND Engine Mode Cranking AND Run Crank Low TIme Error AND Rational Sensor Comparator Fault Active AND DIfferential ECT Condition Detected AND Diagnostic System Disabled Ambient Temperature	1.00 ==TRUE >= 28,800.00 == FALSE == FALSE == FALSE == FALSE == FALSE > -60.00 0.00 == FALSE	Function Task: 100 ms /sample, continuousNA	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 33.00 C	Monitor Enable Condition AND Engine soak (not run) time AND Enginer Mode Crank AND Run Crank Low Time Error AND Rational Sensor Compare Fault Active AND Differential ECT Condition Detected AND Diagnosis System Disable AND Ambient Temperature	1.00 ==TRUE >= 28,800.00 == FALSE == FALSE == FALSE == FALSE == FALSE > -60.00 0.00	NA	Type B, 2 Trips

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

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	Detects unexpected CAN activity on the sensor bus. This diagnostic reports the DTC when controller-specific CAN frames are received while the sensor bus relay is commanded "off."	Continued reception of sensor bus CAN frames during driver off state indicates a stuck on circuit failure. Controller specific received CAN frames are selected to determine continued CAN activity.		Sensor Bus Relay feedback circuit high voltage diagnostic enabled Sensor Bus Relay commanded “OFF” No Sensor Bus active DTCs:	= 1 P16D7, P16D8, P16D9	6 failures out of 10 samples 250ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Circuit Low	P15CC	This monitor refers to electrical fails on the differential pressure temperature information, covering the out of range low. The monitor compares the raw temperature signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Differential pressure sensor Temperature information	< -73.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Circuit High	P15CD	This monitor refers to electrical fails on the differential pressure temperature information sensor, covering the out of range high. The monitor compares the raw temperature signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Differential pressure sensor Temperature information	> 438.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Intermittent	P15CE	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent differential pressure temperature information samples exceeds a certain threshold	> 20.00 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags for the differenctial pressure temperature information (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on differential pressure temperature information (out of range high/low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DPST_CktFlt	12.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 1 DPS A Temperature Sensor Key on Test	P15CF	This monitor checks if the raw signal is affected by offset issue comparing a measured DPS temperature at key on with a average temperature calculated at key on.	Difference between the average temperature calculated at key one the DPS measured temperature shall be greater than in case block heater is not detected instead shall be greater than in case the Block heater is detected	> 20.00 [°C] > 30.00 [°C]	Monitor enabled by dedicated calibration AND Ambient temperature greater than a calibratable threshold with hysteresis AND Diagnostic system reset status AND Electrical errors flags for the differential pressure temperature information (out of range high/ low,intermittent and loss of communication in case of digital sensor) AND Average temperature calculation valid AND Run Cranck Ignition in Range AND No electrical fault on	1.00 [Boolean] > -20.00 2.00 ==FALSE == FALSE ==TRUE ==TRUE DPST_CktFlt	2.00 fail samples out of 2.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					differential temperature information(out of range high/low, intermittent and loss of communication in case of digital sensor) Key on report done	 ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Circuit Low	P15D4	This monitor refers to electrical fails on the downstream relative pressure temperature information, covering the out of range low. The monitor compares the raw temperature signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Downstream relative pressure sensor Temperature information	< -73.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Circuit High	P15D5	This monitor refers to electrical fails on the downstream relative pressure temperature information sensor, covering the out of range high. The monitor compares the raw temperature signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Downstream relative pressure sensor Temperature information	> 438.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Intermittent	P15D6	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent downstream relative pressure temperature information samples exceeds a certain threshold	> 20.00 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags for the downstream relative pressure temperature information (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on downstream relative pressure temperature information(out of range high/low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DRST_CktFlt	12.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Sensor 2 DRS C Temperature Sensor Key on Test	P15D7	This monitor checks if the raw signal is affected by offset issue comparing a measured DRS temperature at key on with a average temperature calculated at key on.	Difference between the average temperature calculated at key one the DRS measured temperature shall be greater than in case block heater is not detected instead shall be greater than a calibratalble value in case the Block heater is detected	> 20.00 [°C] > 30.00 [°C]	Monitor enabled by dedicated calibration AND Ambient temperature greater than a calibratable threshold with hysteresis AND Diagnostic system reset status AND Electrical errors flags for the downstream relative pressure temperature information (out of range high/low,intermittent and loss of communication in case of digital sensor) AND Average temperature calculation valid AND Run Cranck Ignition in Range AND No electrical fault on	1.00 [Boolean] > -20.00 2.00 ==FALSE == FALSE ==TRUE ==TRUE DRST_CktFlt	2.00 fail samples out of 2.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					downstream relative pressure temperature information(out of range high/low, intermittent and loss of communication in case of digital sensor) Key on report done	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough.	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** 55.00 Volts 55.00 Volts	240 / 480 counts; or 175.000 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	 Table, f(IAT). See supporting tables: **P16BC_PT Relay Pull-in Run/Crank Voltage f(IAT)** 55.00 Volts 55.00 Volts	240 / 480 counts; or 175.000 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 3 Low Voltage - (Diesel Controllers ONLY)	P16BD	Detects low voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 3 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

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 - (GEN IV and beyond controllers ONLY)	P16BF	Detects high voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 3 high voltage	Relay voltage >= 4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit	P16D7	Detects an open circuit in the sensor bus relay circuit. This diagnostic reports the DTC when an open circuit is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 K Ω ohms impedance between output and controller ground	Sensor Bus relay circuit open diagnostic = TRUE Run/Crank Voltage	1.00 Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit Low	P16D8	Detects a short to ground in the sensor bus relay circuit. This diagnostic reports the DTC when a short to ground is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: ≤ 0.5 Ω impedance between output and controller ground	Sensor Bus relay circuit short to ground diagnostic = TRUE Run/Crank Voltage	1.00 Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D7 may also set (Sensor Bus Relay Control Circuit Open).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit High	P16D9	Detects a short to power in the sensor bus relay circuit. This diagnostic reports the DTC when a short to power is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: ≤ 0.5 Ω impedance between output and controller power	Sensor Bus relay circuit short to power diagnostic = TRUE Run/Crank Voltage	1.00 Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
SCR1 Plouton NOx Conversion Efficiency Monitor - EWMA Enabled	P20EE	It detects a SCR1 catalyst malfunction when its NOx conversion capability decreases to the point that emissions exceed OBD emissions threshold. SCR1 Plouton NOx conversion efficiency monitoring estimates, using a model-based approach, the maximum SCR1 NH3 storage capacity (maximum amount of NH3 that the component is still able to store). The diagnostic parameter (f_avg) is an estimator of the overall deviations between the SCR1 ammonia storage capacity estimates and a nominal value in a set of valid samples. EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported.	Check if the EWMA filtererd diagnostic parameter (f_avg) is above the: - Fail thrsh (if SCR_CatEffFA = FALSE) - Repass thrsh (if SCR_CatEffFA = TRUE)	Fail Thrsh 1,899,999,976,158,140.00000 Repass Thrsh 10,000,000,149,011,600.00000	TEST ENABLED No DTC present: Time elapsed since SCR chemical model not in fault Diagnostic system not disabled Engine running DEF system ready If DEF quality sensor present: DEF concentration Upstream SCR1 NOx sensor measurement reliable Downstream SCR1 NOx sensor measurement reliable DEF Tank state Time elapsed since DEF Tank state condition satisfied DEF Tank state	1 NOX_NOx_SnsrCatUpFlt SCR_NOxSnsrDwnFlt SCR_ThermalMdlFlt EGT_SnsrSCR_DwnFlt SCR_ExhGasVolFlowFlt SCR_RDP_FA SCR_TipStuckFltSt SCR_DEFMV_FA SCR_ChemicalMdlFlt SBR_RlyFA SCR_DEFSysFlt_IUPR_DenDsbl EXF_TotExhSCR_UpFlt EXF_TotExhCatUpFlt > 5.00 s TRUE TRUE TRUE DEFQS present = 1 > 30 % (295 % <hys< 30 %) TRUE TRUE	The diagnostic parameter is calculated collecting and averaging 300 samples when enabling conditions are satisfied, then filtering the resuting mean value by means of EWMA filter. 250 ms/sample. FIR Gain = 1.00 TestPerTrip <= 1.00 TotTest <= 2.00 RR Gain = 1.00 TestPerTrip <= 1.00 TotTest <= 2.00 STD	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time elapsed since DEF Tank state condition satisfied DEF strategy for emission reduction not inhibited in case of a DPF clogging, only for emergency vehicles; Number of DPF regeneration events successfully completed after vehicle exits from assembly plant SCR Service Bay test Time elapsed since SCR Service Bay test NOx Storage model Time elapsed since NOx Storage condition satisfied Conditions satisfied NOx inlet concentration in ppm Condition satisfied NOx inlet flow in g/s Condition satisfied NOx inlet gradient Time elapsed since NOx inlet conditions satisfied	Not Frozen > 300.00 s Partially Frozen and able to inject the maximum injection quantity > 1.00 s TRUE > 1 Not Running > 300 s <= 20.00 > 1.00 s > 20.00 < 900.00 < 25.00 g/s < 350.00 >= 10.00 s >= 220.00 °C <= 315.00	Gain = 1.00 TestPerTrip <= 1	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Estimated SCR1 substrate temperature to enable the monitoring after init events condition satisfied Ambient temperature Ambient pressure SCR PCS Control Time elapsed since SCR PCS Control condition satisfied SCR1 substrate temperature Time elapsed since SCR1 substrate temperature satisfied Combustion mode Time elapsed since Combustion mode condition satisfied The estimated error variance of NH3 storage (P11)	°C > -22.00 °C (-24.00 °C <hys< -22.00 °C) > 70.00 kPa (69.00 kPa <hys< 70.00 kPa) PCS_Dosing PCS_RemedialAction > 5.00 s > 220.00 °C < 450.00 °C > 60.00 s **SCR_Eff1_CombMode_Enbl** > 600.00 s <= 100.00000 <= 20.00000 <= 220.00000 <= 1 <= 1 <= 1		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Injector Performance - Low Reductant Consumption	P20FE	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery from 1st DEF Injector.This monitor determines when RDP compensation has achieved a compensation factor so high that the expected pressure drop does not guarantee proper reductant delivery performance.	EWMA of Reductant Delivery Perfomance Compensation Factor	> 14,199,999,570,846,600.00	Closed Loop of Reductant Delivery Performance Compensation active	== TRUE	Function Task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 < (100% corresponds to 5.0 Volt)	92,498,779,296,875.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 641,015,625.00 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 > (100% corresponds to 5.0 Volt)	9,499,969,482,421,88 0.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 641,015,625.00 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 < (100% corresponds to 5.0 Volt)	6,500,244,140,625.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 641,015,625.00 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 > (100% corresponds to 5.0 Volt)	5,200,042,724,609,38 0.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 641,015,625.00 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 >	500,030,517,578,125.000 % offset at min. pedal position with a linear threshold to 50,503,082,275,390,600.000 % at max. pedal position	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 641,015,625.00 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) >	35,003,662,109,375.000 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 641,015,625.00 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.
Barometric Pressure (BARO) Sensor Performance (3 intake air pressure sensor configuration)	P2227	This monitor is used to identify BARO sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If BARO sensor is not in agreement with the other two the monitor is able to pinpoint BARO as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			BARO Pressure OR BARO Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	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	< 20.0 % of 5 Volt Range (This is equal to 50.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 85.0 % of 5 Volt Range (This is equal to 115.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Inlet Pressure (TCIAP) Sensor Performance (3 intake air pressure sensor configuration)	P227B	This monitor is used to identify TCIAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running) If TCIAP sensor is not in agreement with the other two the monitor is able to pinpoint TCIAP as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crank relay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		
			TCIAP Pressure OR TCIAP Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	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, applications with LIN MAF)	P227C	Detects an eroneously low value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	< 45.0 kPa	Diagnostic is Enabled LIN Communications established with MAF		160 failures out of 200 samples 1 sample every 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.
Barometric Pressure Sensor Circuit C High (Diesel, applications with LIN MAF)	P227D	Detects an eroneously high value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	> 115.0 kPa	Diagnostic is Enabled LIN Communications established with MAF		160 failures out of 200 samples 1 sample every 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.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic (applications with LIN MAF)	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous)	> 100 kPa 80 consecutive BARO C readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 2.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 - Forced Engine Shutdown	P228A	Determines when rail pressure is lower than desired setpoint and metering unit actuator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded fuel flow for metering unit	> 30 MPa ≥ Maximum flow deliverable by high pressure pump (refer to *RailPresCntrl* section)	Powertrain relay voltage Engine Mode Run Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*)	>= 11.0 V == True == True	160 failures out of 320 samples 25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 2 - Forced Engine Shutdown	P228B	Determines when rail pressure is lower than desired setpoint and rail pressure regulator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded pressure for pressure regulator valve	> 30 MPa ≥ 45 to 1,825 MPa (see table **P228B Pressure Regulator completely closed command**)	Powertrain relay voltage Engine Mode Run Pressure Regulator controlled in closed loop (refer to *RailPresCntrl*)	>= 11.0 V == True == True	160 failures out of 320 samples 25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low	P228C	Determines when rail pressure is lower than desired setpoint.	Rail pressure setpoint - measured rail pressure	> 16.00 MPa	Powertrain relay voltage Engine Mode Run Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0 V == True == True > 4.0 mm^3/stroke == 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >= -40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Rail pressure setpoint - measured rail pressure	> 16.00 MPa	Powertrain relay voltage Engine Mode Run Pressure Regulator controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0 V == True == True > 2.0 mm^3/stroke == 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >= -40 °C)	320 failures out of 640 samples 25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High	P228D	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< - -17.00 MPa	Powertrain relay voltage Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0 V == True > 4.0 mm^3/stroke > -40 °C == 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >= -40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	< -17 MPa	Powertrain relay voltage Pressure Regulator controlled in closed loop (refer to RailPresCntrl)	>= 11.0 V == True	320 failures out of 640 samples 25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel injected quantity	> 2.00 mm^3/stroke		
					(Low fuel level calibrated as enabling condition	== 0.00		
					OR			
					LowFuelConditionDiagnostic	== False)		
					(Air ambient pressure calibrated as enabling condition	== 0.00		
					OR			
					Air ambient pressure	>= 0 kPa)		
					(Air ambient temperature calibrated as enabling condition	== 0.00		
					OR			
					Air ambient temperature	>= -40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 2 Performance	P2293	Determines when rail pressure is above maximum threshold when pressure is governed by Pressure Regulator valve.	Rail pressure	> 68 to 238 MPa (see table **P2293 Maximum rail pressure with PR** If extended area is disabled) OR > 68.00 to 238.00 MPa (see table **P2293 Extended Maximum rail pressure with PR** If extended area is enabled)	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl*)	>= 11.0 == True	121 failures out of 242 samples OR 121 continuous failures 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	≥ 11.00 V == FALSE == TRUE == FALSE	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator B Solenoid Supply Voltage Control Circuit Low	P233E	This DTC detects a short circuit to ground of the high side driver circuit of the Pressure Regulator valve	Voltage high across High Side driver of the Pressure Regulator valve during ON state indicates short to ground	Impedence between High Side pin of the Pressure Regulator and the controller ground ≤ 0.5 Ω	Powertrain relay voltage Engine cranking Run crank active	≥ 11.00 V == FALSE == TRUE	61.00 failures out of 122.00 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 B Solenoid Supply Voltage Control Circuit High	P233F	This DTC detects a short circuit to power of the high side driver circuit of the Pressure Regulator valve	Voltage low across High Side driver of the Pressure Regulator valve during OFF state indicates short to power	Impedence between High Side pin of the Pressure regulator valve and the controller power ≤ 0.5 Ω	Powertrain relay voltage Engine cranking Run crank active	≥ 11.00 V == FALSE == TRUE	61.00 failures out of 122.00 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.
Particulate filter differential pressure too low	P244A	The monitor has the purpose of detecting whether the upstream pipe is leaking or disconnected. The monitor compares the sensed differential pressure across the particulate filter with a threshold. This threshold value is estimated as output of a map, function of the soot load estimation and the exhaust gass mass flow.	Differential Pressure Sensor Value	<**DPS_DPL_Thrsh**	Monitor enabled by dedicated calibration AND engine mode run AND Model Pipes Temperature enablement AND No fault affect Exhaust mass Flow and Soot load model AND no offset, quick change, elettrical check and DPS Too Hi, no electrical and quicke change fault attected the DPS temperature information AND Soot load inside a calibratable value with hysteresis AND	1.00 ==TRUE ==TRUE ==TRUE DPS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPH_Flt DPST_CktFlt DPST_QckChgFlt < 100.00 > 0.00 2.00	200.00 fail samples out of 250.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						< 80.00		
					Exhaust FLow lower than a calibratable with hysteresis	5.00		
					AND	> 100.00 < 0.00		
					Exhaust vallve 1 inside a calibratable range with hysteresis	0.00 > 100.00 < 0.00		
					AND	0.00		
					Exhaust vallve 2 inside a calibratable range with hysteresis			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Filter differential pressure too high	P244B	The monitor has the purpose of detecting whether the downstream pipe is leaking or disconnected. This monitor has two differerent concepts, depending on the available hardware (sensor type). If the sensor supports the reading of the downstream filter relative to ambient pressure, the diagnostic compares this value with a threshold (DRS concept). Otherwise, the monitor compares the ratio between the sensed differential pressure across the filter and the exhaust gas mass flow with a threshold value. This threshold value is estimated as output of a map, function of the soot load estimation and the upstream filter sensed temparature. The ratio used as test parameter is calculated over a time window, whose value is calibratable (DPS concept).	in case: 0.00 Differential Pressure Sensor moving average else Differential Pressure Sensor moving average	==1 >AvrThrshAvg_calculated > **DPS_DPHD_RatioThrsh**	Monitor enabled by dedicated calibration Monitore enable for Downstream Too high set to False AND engine mode run AND Model Pipes Temperature enable AND No fault affect Exhaust mass Flow and Soot load model AND no offset, quick change, electrical check and DPS Too Low,no electrical and quick change of the DPST temperature fault No fault on Temperature upstream the Filter AND No fault Exhaust Back Pressure measured position	1.00 1.00 ==TRUE ==TRUE =TRUE DPS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPL_Flt DPST_CktFlt DPST_QckChgFlt EGT_SnsrCatUpFlt ==TRUE	Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND Exhaust Back Pressure measured position inside a calibratable value with hysteresis AND Soot load inside a calibratable value with hysteresis AND The Temperature Upstream the filter inside a calibratable range with hysteresis AND Exhaust flow lower than a calibratable value with hysteresis and shall ne evalueted after a calibratable time AND Exhaust vallve flap 1 inside a calibratable range with hysteresis AND	> 100.00 < -1.00 5.00 < 1,000.00 > 0.00 2.00 < 650.00 > 250.00 10.00 < 80.00 5.00 0.00 > 100.00 < -1.00 > 100.00 < -1.00 5.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust vallve flap 2 inside a calibratable range with hysteresis			
			Downstream relative pressure	< 3,999,999,910,593,030.00	Monitor enabled by dedicated calibration Monitore enable for DRS Too high monitor set to True AND engine mode run AND Model Pipes Temperature enable AND No fault affect Exhaust mass Flow AND no DRS offset fault, no DRS quick change fault, no DRS elettica check fault and DPS Too low fault, no DRS temperature quick change fault, no DRS temperature electrical fault .	1.00 1.00 ==TRUE ==TRUE ==TRUE DRS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPL_Flt DRST_CktFlt DRST_QckChgFlt	200.00 fail samples out of 250.00 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.
					AND no fault Exhaust Back Pressure measured position AND Exhaust Back Pressure measured position inside a calibratable value with hysteresis AND Exhaust mass Flow with hysteresis and shall ne evalueted after a calibratable time AND Exhaust vallve flap 1 inside a calibratable range with hysteresis AND Exhaust vallve flap 2 inside a calibratable range with hysteresis	==TRUE > 100.00 < -1.00 5.00 < 80.00 5.00 0.00 > 100.00 < -1.00 5.00 > 100.00 < -1.00 5.00 > 1.00 5.00 > 70.00 5.00		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Differential pressure sensor offset rationality	P2452	This monitor verifies if the differential pressure for the particulate filter, checked in no flow conditions (0 kPa expected differential pressure when the engine is not running), is out of specification (sensor accuracy).	the absoulute difference between the Offset Differential value and the calibratabe offset Nominal vallue (4,711,999,893,188,480.0 0)	> 2,200,000,047,683,72 0.00 [%]	Monitor enabled by dedicated calibration AND **DPS offset learn completed** AND Model Pipes Temperature enablement AND Offeset Report Done No DPS electrical fault, no DPS stuck fault or no DPS quick change faults,no DPS Temperature fault, no DPS Temperature quick chenage fault, no enge not run fault	1.00 [Boolean] ==TRUE ==TRUE ==FALSE DPS_CktFlt DPS_QckChgFlt DPS_StkFlt DPST_CktFlt DPST_QckChgFlt EngineModeNotRunTimer_FA	No debounce 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.
Differential pressure sensor stuck in range	P2453	This monitor detects a stuck signal, reporting a failure if the signal does not change when it is expecteded to (during transient phases).	Differential pressure variation lower than expected	<= 14,949,999,749,660,500.00 [%]	Monitor enabled by dedicated calibration AND Engine movement detection AND Model Pipes Temperature enable AND No electrical, plausibility, offset and quick change faults affecting the sensors, no DPS temperature electrical fault, no DPS quick change Temperature fault. AND Engine speed variation AND Fuel quantity variation AND Minimum air flow variation value	1.00 [Boolean] == TRUE ==TRUE DPS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPST_CktFlt DPST_QckChgFlt > 300.00 [rpm/s] > 20.00 [l/s] > 50.00	11.00 fail samples out of 15.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Differential pressure sensor out of range low	P2454	This monitor refers to electrical fails on the pressure sensor, covering the out of range low. The monitor compares the raw differential pressure signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Signal voltage raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a short to ground; a fault is detected when the value is lower than a certain threhsold.	< 24,413,999,170,064,900.00 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Differential pressure sensor out of range high	P2455	This monitor refers to electrical fails on the differential pressure sensor, covering the out of range high. The monitor compares the raw differential pressure signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Signal raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a open circuit or a short to battery; a fault is detected when the value exceeds a certain threhsold.	> 9,980,467,987,060,550.00 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE =FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Differential pressure sensor quick change	P2456	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent differential pressure raw signal samples exceeds a certain threshold	> 20.00 [%]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DPS_CktFlt	99.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Reductant Injection Control At Limit - Flow Too High	P249E	This diagnosis checks if the DEF injection system has exceeded the lower limit of correction authority. The monitoring is executed by comparing the long-term adaptation factor (LTAF) with a calibratable threshold: LTAF < OBD low threshold. The long-term adaptation factor is calculated based on the information given by the NH3 storage correction strategy. This factor represents the measured deviation of the complete SCR system and shall be used to compensate it by making a correction over the DEF injection quantity.	Long-term adaptation factor (LTAF) lower than calibratable threshold	LTAF < <KeSCRD_K_LTAdapMin>	Test enabled by calibration;	CalOut = <KeSCRD_b_LTAdapDiagEnbl> [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.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too Low	P2C1F	Determines when rail pressure is lower than desired setpoint during Cold Start	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	> 16.00 MPa > 16.00 MPa	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR (Fuel injected quantity (Low fuel level calibrated	== TRUE >= 11.0 V == True == True > 4.0 mm^3/stroke == 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >= -40 °C)) > 2.0 mm^3/stroke	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	== 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >= -40 °C))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too High	P2C20	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	< - -17.00 MPa < -17 MPa	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR	== TRUE >= 11.0 V == True == True > 4.0 mm^3/stroke > -40 °C == 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >= -40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Fuel injected quantity	> 2.00 mm^3/stroke		
					(			
					Low fuel level calibrated as enabling condition	== 0.00		
					OR			
					LowFuelConditionDiagnostic	== False)		
					(			
					Air ambient pressure calibrated as enabling condition	== 0.00		
					OR			
					Air ambient pressure	>= 0 kPa)		
					(			
					Air ambient temperature calibrated as enabling condition	== 0.00		
					OR			
					Air ambient temperature	>= -40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downstream filter relative pressure sensor offset rationality	P2CE5	This monitor verifies if the downstrem pressure for the particulate filter, checked in no flow conditions (0 kPa expected pressure when the engine is not running), is out of specification (sensor accuracy).	the absoulute difference between the Offset Differential value and the calibratabe offset Nominal vallue (22,797,000,885,009,800.00)	>[% 2,200,000,047,683,720.00]	Monitor enabled by dedicated calibration AND **DRS Offset Learn Completed** AND Model Pipes Temperature enablement AND Offeset Report Done AND No DRS pressure electrical, rationality or quick change faults , no DRS temperature information electricalfaul, no DRS temperature quiche change faul, no enge not run timer fault.	1.00 [Boolean] ==TRUE ==TRUE ==FALSE DPS_CktFlt DPS_QckChgFlt DRS_StkFlt DRST_CktFlt DRST_QckChgFlt EngineModeNotRunTimer_FA	No debounce Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downstream filter relative pressure sensor stuck in range	P2CE6	This monitor detects a stuck signal, reporting a failure if the signal does not change when it is expecteded to (during transient phases).	Downsteam pressure variation lower than expected	<= [%] 11,320,000,141,859,100.00	Monitor enabled by dedicated calibration AND Engine movement detection AND No electrical, plausibility, offset and quick change faults affecting the sensors, no DRS temperature electrical fault,no quick change DRS temperature fault Model Pipes Temperature enablement AND Engine speed variation AND Fuel quantity variation AND Minimum air flow variation value	1.00 [Boolean] == TRUE DRS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DRST_CktFlt DRST_QckChgFlt ==TRUE > 300.00 [rpm/s] > 20.00 [l/s] > 50.00	11.00 fail samples out of 15.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downstream relative pressure sensor out of range low	P2CE7	This monitor refers to electrical fails on the pressure sensor, covering the out of range low. The monitor compares the raw downstream relativedifferential pressure signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Signal voltage raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a short to ground; a fault is detected when the value is lower than a certain threhsold.	< 2,441,394,329,071,050.00 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downstream relative pressure sensor out of range high	P2CE8	This monitor refers to electrical fails on the downstream relativedifferential pressure sensor, covering the out of range high. The monitor compares the raw downstream relativedifferential pressure signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Signal raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a open circuit or a short to battery; a fault is detected when the value exceeds a certain threhsold.	> 9,980,467,987,060,550.00 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE =FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downstream relative pressure sensor quick change	P2CE9	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent downstream relative pressure raw signal samples exceeds a certain threshold	> 20.00 [%]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DRS_CktFlt	99.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Differential pressure sensor loss of communication	U0601	This monitor refers to electrical fails on the differential pressure sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Digital differential pressure sensor message fault higher than a fixed value 2) Minimum digital differential pressure sensor message age is reached	> 0 > 125.00 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type 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 Exhaust Gas Recirculation Temperature Sensor 1	U068E	This function has the purpose to detect is there any proble of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off, sensor internal faults that cause the SENT protocol communication faults. In this case two DTC shall be set, the DTCs relative to a Module 1 or Module2, it depende at which module the EGRT1 sensore is connected.	Message Faults OR Message Age	>0 100.00	Monitor Enable Condition RunCrankActive EngModeCrank RunCrankIgnInRange DiagSystemDsbl	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 failures out of 25.00 samples 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downstream relative pressure sensor loss of communication	U0696	This monitor refers to electrical fails on the downstream relative pressure sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Downstream relative pressure sensor message fault higher than a fixed value 2) Minimum digital downstream relative differential pressure sensor message age is reached	> 0 > 125.00 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type 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 Bank 1 Sensor 1 DPS "A" Temperature Sensor	U06B4	This monitor refers to electrical fails on the differential pressure temperature sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Digital differential pressure sensor message fault higher than a fixed value 2) Minimum digital differential pressure sensor message age is reached	 > 0 > 125.00 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type 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 Bank 1 Sensor 2 DRS "C" Temperature Sensor	U06B6	This monitor refers to electrical fails on the downstream relative pressure temperature information, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Downstream relative pressure sensor message fault higher than a fixed value 2) Minimum digital downstream relative differential pressure sensor message age is reached	 > 0 > 125.00 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position 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 when the VGT is fully closed< low threshold OR physical travel measured at key off hen the VGT is fully closed> high threshold OR physical travel measured at key off when the VGT is fully open< low threshold OR physical travel measured at key off hen the VGT is fully open> high threshold	< 6,079,999,923,706,060.00 [%] OR > 944,000,015,258,789.00 [%] OR < 25.00 [%] OR > 27,399,999,618,530,300.00 [%]	Test enabled by calibration Key signal is off 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.
Turbocharger VGT A Performance (VGT Smart)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	> 16.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation) VGT position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant	== 1.00 > 11.00 [V] VGT_PstnSnsrOfstFA ==FALSE VGT_SmartActrFA ==FALSE CFM_VGT_CommFA ==FALSE < 100.00 [%/s] > -100.00 [%/s] for 5.00 [s] >= 0.00 [°C]	420.00 fail count out of 520.00 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.
					temperature sensor			
					Outside air temperature higher or equal to minimum threshold	ECT_Sensor_FA ==FALSE		
					No faults present on outside air temperature sensor	>= -60.00 [°C]		
					No mechanical stop soft approach in progress	OAT_PtEstFiltFA ==FALSE		
					No anti-sticking procedure in progress			

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Low	P007C	This monitor checks if the CAC up air temperature sensor is out of electrical range low	Charge air cooler up air temperature resistance value < low threshold	< 7,110,000,133,514,400.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit High	P007D	This monitor checks if the CAC up air temperature sensor is out of electrical range high	Charge air cooler up air temperature resistance value > high threshold	> 753,016.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold OR Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_UpCktFA ==FALSE	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 HWIO error status different from INDETERMINATE status	== 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 (OBDII only)	P0101	This monitor checks if the MAF sensor measure is coherent with MAF estimation when the HP EGR and LP EGR are closed. It is able to detect MAF sensor wiring harness poor contacts, MAF sensor internal fault (offset), leaks from the induction air circuit, leaks from the recirculation exhuast gas circuit. For OBDII market, it can be used to detect a PCV disconnection in case a dedicated pressure sensor is not present. The standard test can be calibrated to run when engine conditions are recognised as IDLE, OVERRUN or HIGH LOAD. An intrusive test can be enabled in idle, to force the HP EGR and the LP EGR to close when particular conditions are encountered, to allow the monitoring to run. An intrusive test can be enabled in overrun, to force the HP EGR and the LP EGR to close and the throttle valve to open when particular	Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 125.00 [ratio] < 75.00 [ratio]	Calibration on diagnostic enabling PT relay supply voltage in range MAF sensor is not depowered Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor Outside Ambient Temperature in range OR Fault present on Ouside Air temperature Induction air temperature No fault present on induction air temperature sensor (Engine Coolant	P0101: MAF performance enabling ==TRUE (see FreeForm) > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVld ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE >= -20.00 [°C] OR OAT_PtEstFiltFA==TRUE > -20.00 [°C] IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE > 68.00 [°C]	Test is evaluated after the enabling conditions are satisfied for a number of samples == 240.00 Sampling time is: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		conditions are encountered, to allow the monitoring to run in case the Diesel Exhaust Cooling Prevention (DECP) strategy is requiring EGR usage and/or throttle control during cut-off maneuvers.			Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	==TRUE < 130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 695.00 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 68.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					HP EGR valve position	<= 1.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<= 1.00 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine works in IDLE, OVERRUN or HIGH LOAD conditions	Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow	> 125.00 [ratio]	Intrusive Test in idle enabled by calibration	1.00 ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples == 240.00 Sampling time is: 12.5 ms	
			Drift low check: drift of the mass air flow	< 75.00 [ratio]	MAF rationality monitoring enabled by calibration	P0101: MAF performance enabling ==TRUE (see FreeForm)		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**		Diagnostic has not run in current driving cycle yet	==TRUE		
					SCR predicted NOx conversion efficiency	> 6,000,000,238,418,580.0 0 [ratio]		
					Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	< 3.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					Desired fuel in range, with hysteresis			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR Global OBD flag for fuel quantity at idle in range PT relay supply voltage in range MAF sensor is not depowered Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor Outside Ambient Temperature in range OR Fault present on Ouside Air temperature Induction air temperature No fault present on induction air temperature	Enabled if < 5.00 [mm^3] AND > 0.00 [mm^3] Disabled if > 10.00 [mm^3] OR < 0.00 [mm^3] OR ==TRUE > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVld ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE > -20.00 [°C] OR OAT_PtEstFiltFA==TRUE > -20.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor (Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature No faults detected on engine coolant temperature sensor Barometric pressure No faults detected on barometric pressure sensor Throttle valve position No faults detected on Throttle valve position sensor Engine speed in range OR Global OBD flag for idle speed in range	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE > 68.00 [°C] ==TRUE < 130.00 [°C] ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE > 695.00 [kPa] AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE > 68.00 [%] TPS_PstnSnsrFA ==FALSE > 600.00 [rpm] < 800.00 [rpm]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	OR ==TRUE		
					Intake manifold pressure in range	>= 10.00 [s]		
					Intake manifold pressure is in steady state (SS)	> 70.00 [kPa] < 200.00 [kPa]		
						when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, | Intake manifold pressure - p_ref| < 200.00 [kPa] for maintaining the SS ON		
					Time elapsed after previous intrusive test request has aborted	> 2.00 [s]		
					Once all the conditions above are satisfied, additional conditions on HP EGR and LP EGR valves must be verified within a time limit:	< 1.00 [s]		
					HP EGR valve position	<= 1.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<= 1.00 [%]		
					No faults detected on LP EGR valve position			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor All conditions are verified for a time	LPE_PstnSnsrFA ==FALSE > 2.00 [s]		
			Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 125.00 [ratio] < 75.00 [ratio]	Intrusive Test in overrun enabled by calibration MAF rationality monitoring enabled by calibration Diagnostic has not run in current driving cycle yet PT relay supply voltage in range MAF sensor is not depowered Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor	0.00 ==TRUE P0101: MAF performance enabling ==TRUE (see FreeForm) ==TRUE > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVld ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE	Test is evaluated after the enabling conditions are satisfied for a number of samples == 240.00 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.
					Outside Ambient Temperature in range OR Fault present on Ouside Air temperature	> -20.00 [°C] OR OAT_PtEstFiltFA==TRUE		
					Induction air temperature	> -20.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 68.00 [°C] ==TRUE < 130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 695.00 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Time elapsed after previous intrusive test	> 2.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					request has aborted			
					Engine works in OVERRUN conditions, except for the conditions on Intake manifold pressure in range and in steady state (SS)	Refer to "Engine conditions" Free Form		
					Intake manifold pressure greater than a threshold	> **P0101: Manifold pressure Low limit in** (**Overrun** - 0.00) [kPa]		
					Intake manifold pressure lower than a threshold, with hysteresis	TRUE if: < **P0101: Manifold pressure High limit in** (**Overrun** - 0.00) [kPa]; FALSE if: > **P0101: Manifold pressure High limit in Overrun** [kPa]		
					Once all the conditions above are satisfied, additional conditions on HP EGR, LP EGR and throttle must be verified within a time limit:	< 1.00 [s]		
					HP EGR valve position	<= 1.00 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<= 1.00 [%]		
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Throttle valve position	> 68.00 [%]		
					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.
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This monitor checks if the MAF sensor is out of electrical range low. The MAF sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	MAF frequency value	< 260.00 [Hz]	Test enabled by calibration PT relay supply voltage in range Share High Side Driver closed All conditions are valid for a time	1.00 ==TRUE > 11.00 [V] ==TRUE >= 3.00 [s]	30.00 fail counts out of 38.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 PT relay supply voltage in range Share High Side Driver closed All conditions are valid for a time	1.00 ==TRUE > 11.00 [V] ==TRUE >= 3.00 [s]	30.00 fail counts out of 38.00 sample counts Function task:100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Trim System Lean Bank 1	P0171	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its minimum value.	Released FSA fuel correction value	< refer to supporting table (**KtFADC_V_FSA_FuelMin**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtnValid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1,399,999,976,158,140.00 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Trim System Rich Bank 1	P0172	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its maximum value.	Released FSA fuel correction value	> refer to supporting table (**KtFADC_V_FSA_Fuel Max**)[mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1,399,999,976,158,140.0 0 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing Perfomance - Over Retarded based on SQP	P01CB	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 1. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 1. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	[°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing Perfomance - Over Advanced based on SQP	P01CC	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 1. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 1. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	-the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing Perfomance - Over Retarded based on SQP	P01CD	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 2. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 2. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing Perfomance - Over Advanced based on SQP	P01CE	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 2. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 2. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing Perfomance - Over Retarded based on SQP	P01CF	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 3. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 3. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing Perfomance - Over Advanced based on SQP	P01D0	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 3. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 3. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel FIlter Temperature Hysteresis on Fuel Temperature	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing Perfomance - Over Retarded based on SQP	P01D1	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 4. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 4. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing Perfomance - Over Advanced based on SQP	P01D2	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 4. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 4. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing Perfomance - Over Retarded based on SQP	P01D3	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 5. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 5. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing Perfomance - Over Advanced based on SQP	P01D4	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 5. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 5. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] < 77.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing Perfomance - Over Retarded based on SQP	P01D5	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 6. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 6. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	< 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing Perfomance - Over Advanced based on SQP	P01D6	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 6. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 6. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] >	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	-40.00 [°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing Perfomance - Over Retarded based on SQP	P01D7	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 7. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 7. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	< 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing Perfomance - Over Advanced based on SQP	P01D8	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 7. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 7. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing Perfomance - Over Retarded based on SQP	P01D9	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 8. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 8. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel FIlter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing Perfomance - Over Advanced based on SQP	P01DA	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 8. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 8. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] >	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		able to calculate the drift, in term of angular degree, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	-40.00 [°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit	P0201	This DTC checks the Injector 1 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit	P0202	This DTC checks the Injector 2 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit	P0203	This DTC checks the Injector 3 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit	P0204	This DTC checks the Injector 4 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Open Circuit	P0205	This DTC checks the Injector 5 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Open Circuit	P0206	This DTC checks the Injector 6 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Open Circuit	P0207	This DTC checks the Injector 7 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Open Circuit	P0208	This DTC checks the Injector 8 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing	P020A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 1 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA or (Active DTC: and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderA FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderA == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing	P020B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 2 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderB FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderB == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing	P020C	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 3 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderC FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderC == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing	P020D	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 4 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 4 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderD FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderD 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing	P020E	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 5 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderE FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderE == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing	P020F	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 6 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderF FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderF == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injection Quantity Monitoring	P0216	This DTC detects an ECU internal fault by comparing requested Energizing Time by Application SW and the actuated Energizing Time by HWIO (Direct Injection Fueling Outputs) on each actuated injection pulse for each cylinder. Two different thresholds (High and Low) are defined for detecting the fault. The monitoring will count an error also in case at least one pulse is dropped on a cylinder.	In order to identify whether there is a fault, the following tests shall be performed: 1. At least one dropped pulse is present (i.e. at least one pulse programmed by the application software is not driven by the ECU) 2. If the actuated ET is greater than the required by application SW, check the following condition: |ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyl)| > calibratable threshold OR If the actuated ET is lower than the required by application SW, check the following condition: |ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyl)| < calibratable threshold where: ETpulseX,HWIO (cyl)) = energizing time feedback read by HWIO for pulseX	> KeFULR_t_QntyMontrETHiThrsh < KeFULR_t_QntyMontrETLoThrsh	Test enabled by calibration Diagnostic System disabled Powertrain relay voltage in range Catalyst Warm-Up boolean from CSERS enabled (this boolean takes into account the combustion mode, the minimum soaking time and the ECT) No monitoring ShutOff conditions present (no FA on Boost Voltage, Injector Electrical monitorings, Pull In Period and Controller Status monitorings) At least one injection pulse is requested by the application software on all cylinders	== KeFULR_b_QntyMontrEnbl [Boolean] = FALSE > 11.00 [V] == FALSE FUL_BoostVoltFA FUL_FuelInjCkt_FA FUL_PullInErrFA FUL_CntrlrStFA = TRUE	KeFULR_Cnt_QntyMontrFailLim failures out of KeFULR_Cnt_QntyMontrSmplLim samples Function Task: angular-based	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and on cylinder cyl ETpulseX,programmed (cyl) = ETpulseX,SW (cyl) + EOIpulseX,HWIO (cyl) = energizing time programmed by SW for pulseX and on cylinder cyl (end of injection is not included) + end of injection feedback read by HWIO for pulseX and on cylinder cyl					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing	P021A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 7 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 7 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderG FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderC == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing	P021B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 8 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 8 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderH FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_FuelInjectedCyl_CiEPSR_CylinderD == 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Control Circuit Low Voltage	P0261	This DTC detects a short circuit to ground of the low side driver circuit of Injector 1.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Control Circuit High Voltage	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Control Circuit Low Voltage	P0264	This DTC detects a short circuit to ground of the low side driver circuit of Injector 2.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Control Circuit High Voltage	P0265	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 2.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit Low Voltage	P0267	This DTC detects a short circuit to ground of the low side driver circuit of Injector 3.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit High Voltage	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. It applies to both air-cooled and water-cooled Charge Air Coolers (WCAC), depending on application. The reference temperature can be selected to account for different architectures or applications, in order to guarantee a robust WPA/BPU separation in all conditions. The selectable temperature sensors used as reference are: Outside Air Temperature, Induction Air Temperature, WCAC inlet coolant temperature.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Reference temperature). Reference temperature can be selected via calibration CeCIDG_e_OutsideTemp : - if equal to CeCIDG_e_InductTemp, it is the induction air temperature; - if equal to CeCIDG_e_OutsideTemp, it is the outside air temperature; - if equal to CeCIDG_e_WCAC_WaterTempIn, it is the water temperature at the WCAC inlet. Each sample of the computed Charge Air Cooler Efficiency (before	< 50.00 [%] **P026A: Efficiency Offset** [%]	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet Vehicle speed in range Compressor flow (Air + LP EGR) in range Engine coolant temperature in range OR OBD Coolant Enable Criteria Throttle valve position Pressure ratio through the compressor in range Temperature difference between upstream charge air cooler temperature and Reference temperature in range Water pump speed in range Environmental pressure in	1.00 ==TRUE ==TRUE > 65.00 [kph] > 20.00 [mg/s] < 400.00 [mg/s] > 70.00 [°C] ==TRUE > 85.00 [%] > 1,225,000,023,841,860.0 0 [ratio] > 33.00 [°C] > -1.00 [rpm]	Test executed after 160.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			the average) is corrected by an offset depending on the compressor flow and the water pump speed.		range			
					Environmental temperature in range	> 695,999,984,741,211.00 [kPa]		
					No fault on vehicle speed sensor	> -20.00 [°C]		
					No fault on engine coolant temperature sensor	VehicleSpeedSensor_FA ==FALSE		
					No fault on throttle position sensor	ECT_Sensor_FA ==FALSE		
					No fault on ambient pressure sensor	TPS_PstnSnsrFA ==FALSE		
					No fault on ambient temperature sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on Reference temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on charge air cooler upstream and downstream temperature sensors	OAT_PtEstFiltFA ==FALSE OR IAT_SensorFA==FALSE OR CIW_TempInFA==FALSE		
						CIT_CAC_UpFA==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Compressor flow estimation is valid	CIT_CAC_DwnFA ==FALSE		
					No fault on Intake Manifold Pressure sensor	INM_ComprTotFlowNotVld ==FALSE		
					No fault on Water pump speed sensor	MAP_SensorFA==FALSE		
						ICPR_b_IC_PmpPerfFA ==FALSE, OR ICPR_b_IC_PmpCktFA ==FALSE, OR ICP_CWP_LcFA ==FALSE, OR ICP_CWP_Rsp_FoFA ==FALSE		
					All the enabling conditions last for a time	>= 2.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injection Timing Performance	P026B	This DTC detects an injection timing only fault by comparison of the requested Start of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW for all cylinders.	< -4.00 OR > 4.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 4,500.00 == TRUE; -	88.00 failures out of 176.00 samples 1 sample every engine revolution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start Strategy not enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Control Circuit Low Voltage	P0270	This DTC detects a short circuit to ground of the low side driver circuit of Injector 4.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Control Circuit Low Voltage	P0273	This DTC detects a short circuit to ground of the low side driver circuit of Injector 5.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Control Circuit High Voltage	P0274	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 5.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit Low Voltage	P0276	This DTC detects a short circuit to ground of the low side driver circuit of Injector 6.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit High Voltage	P0277	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 6.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Control Circuit Low Voltage	P0279	This DTC detects a short circuit to ground of the low side driver circuit of Injector 7.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Control Circuit High Voltage	P0280	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 7.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Control Circuit Low Voltage	P0282	This DTC detects a short circuit to ground of the low side driver circuit of Injector 8.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Control Circuit High Voltage	P0283	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 8.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Fuel Injector Offset Learning At Min Limit based on SQP	P02CC	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02CD	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02CE	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02CF	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D0	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D1	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_Max AdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D2	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D3	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D4	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D5	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D6	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D7	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D8	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02D9	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_Max AdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02DA	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 based on SQP	P02DB	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Performance	P02E1	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor	|Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold No faults present on outside air temperature sensor Throttle position closed loop control active (no faults present on Throttle position sensor, Throttle valve, Throttle position control deviation) Throttle position setpoint in steady state conditions for minimum time	== 1.00 > 11.00 [V] >= 55.00 [°C] ECT_Sensor_FA ==FALSE >= -23.00 [°C] OAT_PtEstFiltFA ==FALSE TPS_PstnSnsrCktFlt== FALSETPS_ActrFA == FALSETPS_PstnDvtnFA == FALSE > -160.00 [%/s] < 160.00 [%/s] for >= 3.00 [s]	1,280.00 fail counts out of 1,600.00 sample counts 640.00 fail counts to enable the open circuit check (P02E0) Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No mechanical stop soft approach in progress No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit Low	P02E2	This monitor checks if the Throttle commands are shorted to ground	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit High	P02E3	This monitor checks if the Throttle commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Stuck Closed	P02E5	This monitor detects the Throttle valve mechanically stuck in a certain position different from its defaulted position (fully open) when the actuator is no longer driven (missing dafaulted position)	Measured Throttle position < minimum threshold	< 80.00 [%]	P02E1 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	 > 1.00 [s] TPS_PstnSnsrFA== FALSE TPS_ActrFA == FALSE TPS_PstnDvtnFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 communication	== 1.00 > 11.00 [V] TPS_SENT_LossCommFlt == FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit High (SENT position sensor)	P02E9	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT communication	== 1.00 > 11.00 [V] TPS_SENT_LossCommFlt == FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Current Range/ Performance	P02EB	This monitor checks if an excessive current flows through the Throttle DC-Motor (e.g. shunt circuit between load, Throttle DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle DC Motor current range/performance H-Bridge driver is ON HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V] TPS_MtrCurrLimTFTKO == FALSE	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.
Cold Start Exhaust Gas Recirculation Current Performance	P034F	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled	==TRUE	1,260.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	== 1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					HP EGR position closed loop control active (no faults present on HP EGR position sensor, HP EGR flap, HP EGR position control deviation)	EGR_PstnSnsrFlt ==FALSE EGR_ActrFA ==FALSE EGR_VlvStkOpenTFTKO ==FALSE		
					HP EGR position setpoint in steady state conditions for minimum time	< 160.00 [%/s] > -160.00 [%/s] for >= 3.00 [s]		
					Engine coolant temperature higher or equal to minimum threshold (calculated with	>= -18.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					a table ECT/OAT) OR Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug/ Heater Indicator Control Circuit High	P037B	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to high voltage.	Test performed by HWIO. A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance R to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R = 0.5 Ω	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True > 11.00 V == False	8.00 failures out of 10.00 samples Sampling rate: 100 ms	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Circuit	P0403	This monitor checks if the HP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from fully closed (default position) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	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 Position Performance	P0404	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold No faults present on outside air temperature sensor	== 1.00 > 11.00 [V] >= 55.00 [°C] ECT_Sensor_FA ==FALSE >= -23.00 [°C] OAT_PtEstFiltFA ==FALSE	1,260.00 fail counts out of 1,600.00 sample counts 630.00 fail counts to enable the open circuit check (P0403) Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR position setpoint in steady state conditions for minimum time	> -160.00 [%/s] < 160.00 [%/s] for >= 375.00 [s]		
					HP EGR position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Sensor Circuit Low Voltage (SENT position sensor)	P0405	This monitor checks if the HP EGR SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration	== 1.00	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					SENT position sensor present	== 0.00		
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No fault on SENT communication	EGR_SENT_LossCommFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Sensor Circuit High Voltage (SENT position sensor)	P0406	This monitor checks if the HP EGR SENT position sensor is out of electrical range high	SENT position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration SENT position sensor present System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) No fault on SENT communication	== 1.00 == 0.00 > 11.00 [V] EGR_SENT_LossCommFlt ==FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor detects the HP EGR valve mechanically stuck in a certain position different from its defaulted position (fully closed) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR position > maximum threshold	> 4,400,000,095,367,430.00 [%]	P0404 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	 > 2.00 [s] EGR_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Circuit Low Voltage	P0489	This monitor checks if the HP EGR commands are shorted to ground	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	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 System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Exceeded Learning Limit (SENT position sensor)	P049D	This monitor checks if the HP EGR SENT position sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold	< 12.00 [%5V] OR > 30.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed position has been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - outside air temperature above a threshold; - no faults present on outside air temperature sensor. Position control in closed loop: battery voltage above a threshold No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation End Of Trip event has elapsed	== 1.00 >= 30.00 [°C] <= 150.00 [°C] ECT_Sensor_FA ==FALSE >= -40.00 [°C] OAT_PtEstFiltFA ==FALSE >= 95.00 [V] EGR_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Diagnostic system enabled (no clear code or EOT in progress)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR “A” Control Temperature Too High	P04FA	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	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 temperature sensor (EGT) 1 out of range monitoring Low	P0545	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog Sensor:** The monitor compares the EGT 1 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a minimum threshold;	< 1.00 [Ohm] < -7,280,000,305,175,780.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost Communication Error A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE ==FASSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring High	P0546	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 1 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a maximum threshold;	> 100,000,000.00 [Ohm] > 12,898,499,755,859,400.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost Communication Error A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

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

Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case **StrongExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				< 0.5* **P054E_IFM_MinFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					(
					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(500.00 , 500.00 + 0.00)[rpm]
						
						<hysteresis(1,560.00 , 1,560.00 + 0.00)[rpm]
							71.00 failures out of 142.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

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

			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				< 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
					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
					if the transmission is manual
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						< 3.00 [kph]
						
						P054E_IFM_CombModesEnbl
						
						<= 5,035,400,390,625.00 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]		

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

			default:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				
				< 0.5* **P054E_IFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
					
					OR
					
					the clutch pedal position
					)
					
					NLT_Active
					
					and
					No active DTC's:
					
					No Neutral Locked Turbine Fault active and Fault Pending:
					VeTLKR_b_NLT_ActvFA
					AND
					VeTLKR_b_NLT_ActvFP
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					(
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					)
						
						> 0.00
						
						< 0.00
						
						==0 [Boolean]
						
						==0 [Boolean]
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						(FUL_GenericInjSysFA
						AND		

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

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

Idle Control System - Fuel Quantity Higher Than Expected	P054F	This DTC detects if the fuel quantity of the torque forming pulse is higher than the expected fuel quantity request when the engine is idle.
		Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature
			Depending on Combustion Mode
			
			case **StrongExhGasWarmUp**:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				> 1.5* **P054F_IFM_MaxFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant temperature
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					{
					CeFULR_e_InGear:
					transmission
					
					CeFULR_e_NeutralPark:
					transmission
					
					CeFULR_e_InGearNeutralPark:
					transmission
					}
					
					and
					engine speed
					
					and
					engine speed
					
					and
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(500.00 , 500.00 + 0.00) [rpm]
						
						< hysteresis(1,560.00 , 1,560.00 + 0.00) [rpm]
							71.00 failures out of 142.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

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

			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			default:
				
				> 1.5* **P054F_IFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature
					{
					OBD Coolant Enable Criteria
					
					OR
					engine coolant temperature
					
					}
					
					and
					outside air temperature
					
					and
					vehicle speed
					
					and
					enabled in the combustion mode
					
					and
					Accelerator Pedal Position
					
					and
					Engine running
					
					and
					PTO_PTO_Active
					
					and
					Run Crank voltage
					
					and
					if the transmission is manual
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						< 3.00 [kph]
						
						P054F_IFM_CombModesEnbl
						
						<= 5,035,400,390,625.00 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]
						
						> 0.00		

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

			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				> 1.5* **P054F_IFM_MaxFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					OR
					
					the clutch pedal position
					)
					
					NLT_Active
					
					and
					No active DTC's:
					
					No Neutral Locked Turbine Fault active and Fault Pending:
					VeTLKR_b_NLT_ActvFA AND VeTLKR_b_NLT_ActvFP
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						< 0.00
						
						==0 [Boolean]
						
						==0 [Boolean]
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						(FUL_GenericInjSysFA AND FUL_GenericInjSysFlt
						)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Injection Timing Performance	P05EC	This DTC detects an injection timing only fault in Cold Start condition by comparison of the requested Start of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW for all cylinders.	< -4.00 OR > 4.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 4,500.00 == TRUE; -	88.00 failures out of 176.00 samples 1 sample every engine revolution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start Strategy enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter - SPI error (SPI communication failed) - ASIC Supply Under/ Over Voltage - ASIC Configuration Register Error - ASIC SPI Fault - ASIC DC-DC Over Voltage/Current - ASIC external clock lost - Injector Timeout Reached - Injector RAM Corruption	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 40.00) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] ≥ 641,015,625.00 [V] - - 40.00 [V]	19 failures out of 38 samples 12.5 ms / sample Continuous	Type A, 1 Trips
			Driver Status	== FAILED (ASIC power supply voltage is < 4.5 V or >33 V)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] ≥ 641,015,625.00 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	
			Driver Status	== FAILED (Injector control circuit configuration register corrupted)	Test enabled by calibration; and Battery voltage and Key ON	== 1 [Boolean] ≥ 641,015,625.00 [V] -	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and Engine is not cranking and Boost Voltage has achieved (at least one time)	- 40.00 [V]		
			Driver Status	== FAILED (SPI Communicatio error)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] ≥ 641,015,625.00 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	
			Driver Status	== FAILED (the Boost converter voltage or current are out of range)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] ≥ 641,015,625.00 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Driver Status	== FAILED (Injector control circuit external clock is no longer available)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] ≥ 641,015,625.00 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	
			Driver Status	== FAILED (the injector has been commanded ON for a time > 4,000.00 us)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] ≥ 641,015,625.00 [V] - - 40.00 [V]	**P062B_CSM_ASIC_TimeOutReached_FailLim** failures out of **P062B_CSM_ASIC_TimeOutReached_SmplLim** samples LoresC	
			Driver Status	== FAILED (Injector control circuit SPRAM and DPRAM corrupted)	Test enabled by calibration; and Battery voltage and Key ON	== 1 [Boolean] ≥ 641,015,625.00 [V] -	**P062B_CSM_ASIC_RAMCorruption_FailLim** failures out of **P062B_CSM_ASIC_RAMCorruption_SmplLim** samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and Engine is not cranking and Boost Voltage has achieved (at least one time)	- 40.00 [V]	LoresC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 60.00 [V] OR < hysteresis(40.00 , 41.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	37 failures out of 74 samples 6.25 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 5 Glow Plug Circuit/Open	P0675	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 6 Glow Plug Circuit/Open	P0676	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 7 Glow Plug Circuit/Open	P0677	This DTC checks the circuit for electrical integrity during operation. Glow plug 7 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 8 Glow Plug Circuit/Open	P0678	This DTC checks the circuit for electrical integrity during operation. Glow plug 8 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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.
Cylinder 5 Glow Plug Circuit Low	P067C	This DTC checks the circuit for electrical integrity during operation. Glow plug 5 pin short to ground.	Test performed by HWIO 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 5 Glow Plug Circuit High	P067D	This DTC checks the circuit for electrical integrity during operation. Glow plug 5 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_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.
Cylinder 6 Glow Plug Circuit Low	P067E	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin short to ground.	Test performed by HWIO 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 6 Glow Plug Circuit High	P067F	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_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.
Cylinder 7 Glow Plug Circuit Low	P068C	This DTC checks the circuit for electrical integrity during operation. Glow plug 7 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 7 Glow Plug Circuit High	P068D	This DTC checks the circuit for electrical integrity during operation. Glow plug 7 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.
Cylinder 8 Glow Plug Circuit Low	P068E	This DTC checks the circuit for electrical integrity during operation. Glow plug 8 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO > 24,993,896,484,375.00 < 9,749,755,859,375.00 [%] 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 8 Glow Plug Circuit High	P068F	This DTC checks the circuit for electrical integrity during operation. Glow plug 8 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.
Cylinder 1 electrical resistance rationality check	P06C5	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 1 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 electrical resistance rationality check	P06C6	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 2 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec= FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 electrical resistance rationality check	P06C7	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 3 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 electrical resistance rationality check	P06C8	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 electrical resistance rationality check	P06C9	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 electrical resistance rationality check	P06CA	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 electrical resistance rationality check	P06CB	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 electrical resistance rationality check	P06CC	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	2,199,999,988,079,07 0.00 < NaGLOD_R_GlowPlug < 2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Initial Position Exceeded Learning Limit (VGT Smart)	P100B	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at End Of Line during the learning procedure is plausibile	physical travel measured at End Of Line when VGT is fully closed < low threshold OR physical travel measured at End Of Line when VGT is fully closed > high threshold OR physical travel measured at End Of Line when VGT is fully open < low threshold OR physical travel measured at End Of Line when VGT is fully open > high threshold	< 670,999,984,741,211.00 [%] OR > 879,000,015,258,789.00 [%] OR < 3,799,999,952,316,280.00 [%] OR > 21,200,000,762,939,500.00 [%]	Test enabled by calibration End Of Line Learning procedure at key off has been successfully completed End Of Trip event has elapsed No fault validated on smart VGT rolling counters	== 1.00 CFM_VGT_CommFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Rail Pressure deviation during cut off based on SQP	P1089	This diagnosis monitors the presence of rail pressure deviation during deceleration fuel cut-off, preventing the enablement of SQP learning. Rail pressure is the only SQP enabler that is not monitored with an accuracy enough to detect a failure that would prevent a correct SQP behavior. So high pressure fuel rail system shall be monitored to detect a rail pressure behavior that does not allow an SQP correct learning. As soon as SQP strategy requests a rail pressure set point a debounce shall start. After that the debounce time is expired or SQP starts to inject, the diagnosis in enabled and a timer shall start to count the SQP learning time on each SQP rail pressure levels. If on at least one rail pressure level: the timer is expired before that SQP strategy performs a learning on all cylinders, then the diagnosis shall report a Test Fail and the DTC	The timer is expired before that SQP strategy performs a learning on all cylinders	> **KaFADD_t_SQP_MaxRailPresTrsh** [ms]	Test enabled by calibration All enabling conditions for SQP learning different from Rail Pressure steady state are satisfied Calibrateable delay time since SQP started to request rail pressure set-point has expired	1.00 FAD_SQA_LrnPresEnbl 15.00 [ms]	Time required to perform a learning with SQP on one rail pressure level. 1 Sample each SQP rail pressure level learning complete.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Performance	P10D5	This monitor checks if the CAC down air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler down air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	> 20.00 [°C]	Enablement calibration set to TRUE	== 1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	< 1.00 [s]		
					Runk Crank Relay voltage in range	> 11.00 [V]		
					The engine has not run for a calibratable time since last key off	>= 28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	< 45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler down air temperature sensors	CIT_CAC_DwnCktFA ==FALSE OR CIT_CAC_DwnSelfCorFA ==FALSE		
					No faults detected on intake manifold air	MnfdTempSensorFA ==FALSE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Low	P10D6	This monitor checks if the CAC down air temperature sensor is out of electrical range low	Charge air cooler down air temperature resistance value < low threshold	< 7,110,000,133,514,400.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	> 753,016.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Intermittent/ Erratic	P10D8	This monitor checks if the CAC down air temperature has an intermittent fault	Charge air cooler down air temperature value > T_MAX_threshold OR Charge air cooler down air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_DwnCktFA ==FALSE	40.00 fail counter over 50.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 key-on monitoring	P113B	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	> 20.00 [°C] > 30.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S1_LostCommFA EGT_CED_B1S1_HiFA EGT_CED_B1S1_LoFA EGT_QED_B1S1_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -10.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 key-on monitoring	P113C	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	> 20.00 [°C] > 25.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S2_LostCommFA EGT_CED_B1S2_HiFA EGT_CED_B1S2_LoFA EGT_QED_B1S2_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -15.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 key-on monitoring	P113D	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	> 20.00 [°C] > 20.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S3_LostCommFA EGT_CED_B1S3_HiFA EGT_CED_B1S3_LoFA EGT_QED_B1S3_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -20.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 4 key-on monitoring	P113E	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	> 20.00 [°C] > 20.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S4_LostCommFA EGT_CED_B1S4_HiFA EGT_CED_B1S4_LoFA EGT_QED_B1S4_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -20.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 5 key-on monitoring	P113F	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	> 20.00 [°C] > 20.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S5_LostCommFA EGT_CED_B1S5_HiFA EGT_CED_B1S5_LoFA EGT_QED_B1S5_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -20.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit	P115E	This diagnosis verifies Engine Out NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit Low Voltage	P115F	This diagnosis verifies Engine Out NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Engine Out NOx Sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit	P116A	This diagnosis verifies Engine Out NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit Low Voltage	P116B	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Engine Out NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Linear pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit	P116D	This diagnosis verifies Engine Out NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit Low Voltage	P116E	This diagnosis verifies Engine Out NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Engine Out NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 30.00 °C	Key is turned on		No time debounce	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time	> 9.00 V > 1.00 s		
					No electrical fault detected on Soot Sensor	NOT(SOT_ElecIFlt)		
					If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass	TPTKO on P1477 TPTKO on P1478		
					Ambient Air pressure	> 70.00 KPa		
					Ambient air pressure sensor not faulty	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					Temperature stored at last sensor power up is still reliable			
					Timer since Soot Sensor heating off is not affected	NOT(ModuleOffTimeErr)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					by error on module off timer			
					Calculation of the reference temperature at system start up is valid:	EGT_TempAvgVld		
					Minimum time from the previous key off to enable the reference temperature calculation	> 28,800.00		
					Diagnostic has not yet reported a pass or failure	NOT (TPTKO OR TFTKO) on P118B		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 1	P118E	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 1st sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 200.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 300.00 Exhaust gas > 50.00 and < 500.00 Exhaust gas flow rate variation < 39,000,000,953,674,300. 00 and then < 4.00 hysteresis) for a time > 17.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S1_FA, EGT_KOD_B1S1_FA, EGT_CED_B1S1_HiFA, EGT_CED_B1S1_LoFA, EGT_CED_B1S1_LostCo mmFA and EGT_SRD_B1S1_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Diesel specific Reliable exhaust manifold pressure information Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds A calibratable delay time for the sensor initialization shall be elapsed	errors = FALSE **Diesel specific** Exhaust manifold pressure reliability = TRUE Time after each combustion mode > **EGT_ERD_B1S1_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S1_CombModeEnbl** **Gasoline specific** Time after GPF regeneration > 900.00 Time after scavenging > 60.00 Time after catalyst light-off > 300.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 2	P118F	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 2nd sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 300.00 Exhaust gas > 50.00 and < 500.00 Exhaust gas flow rate variation < 9,899,999,618,530,270.00 and then < 10.00 hysteresis) for a time > 10.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S2_FA, EGT_KOD_B1S2_FA, EGT_CED_B1S2_HiFA, EGT_CED_B1S2_LoFA, EGT_CED_B1S2_LostCommFA and EGT_SRD_B1S2_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Diesel specific Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds A calibratable delay time for the sensor initialization shall be elapsed	errors = FALSE **Diesel specific** Time after each combustion mode > **EGT_ERD_B1S2_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S2_CombModeEnbl** **Gasoline specific** Time after GPF regeneration > 900.00 Time after scavenging > 60.00 Time after catalyst light-off > 300.00 ==TRUE		

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 Engine Out NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit Low Voltage	P1193	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit High Voltage	P1194	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 3	P1196	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 3rd sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 300.00 Exhaust gas > 50.00 and < 500.00 Exhaust gas flow rate variation < 190.00 and then < 200.00 hysteresis) for a time > 10.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S3_FA, EGT_KOD_B1S3_FA, EGT_CED_B1S3_HiFA, EGT_CED_B1S3_LoFA, EGT_CED_B1S3_LostCommFA and EGT_SRD_B1S3_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Diesel specific Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds AND A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Time after each combustion mode > **EGT_ERD_B1S3_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S3_CombModeEnbl** **Gasoline specific** Time after GPF regeneration > 900.00 Time after scavenging > 60.00 Time after catalyst light-off > 300.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 4	P1197	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 4th sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 300.00 Exhaust gas > 50.00 and < 500.00 Exhaust gas flow rate variation < 190.00 and then < 200.00 hysteresis) for a time > 10.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S4_FA, EGT_KOD_B1S4_FA, EGT_CED_B1S4_HiFA, EGT_CED_B1S4_LoFA, EGT_CED_B1S4_LostCommFA and EGT_SRD_B1S4_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor AND A calibratable delay time for the sensor initialization shall be elapsed	Time after each combustion mode > **EGT_ERD_B1S4_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S4_CombModeEnbl** ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 5	P1198	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 5th sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 300.00 Exhaust gas > 50.00 and < 500.00 Exhaust gas flow rate variation < 190.00 and then < 200.00 hysteresis) for a time > 10.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S5_FA, EGT_KOD_B1S5_FA, EGT_CED_B1S5_HiFA, EGT_CED_B1S5_LoFA, EGT_CED_B1S5_LostCommFA and EGT_SRD_B1S5_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor AND A calibratable delay time for the sensor initialization shall be elapsed	Time after each combustion mode > **EGT_ERD_B1S5_Comb ModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S5_Comb ModeEnbl** ==TRUE		

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 Engine Out NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 NOx-related measurement pin (M2)	open circuit on M2	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Signal Circuit Low Voltage	P119B	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Engine Out NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Post Catalyst NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit Low Voltage	P119E	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit High Voltage	P119F	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit	P11BE	This diagnosis verifies Post Catalyst NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit Low Voltage	P11BF	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Post Catalyst NOx Sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Engine Out NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 1 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_A	 > 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Ground Circuit High Voltage	P11C6	This diagnosis verifies Engine Out NOx Sensor heater ground circuit Short to Battery	Check if there is short circuit to power supply on NOx Sensor 1 heater reference pin (H-)	powershort on H-	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	 > 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Ground Circuit	P11C7	This diagnosis verifies Post Catalyst NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 2 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_B	 > 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Ground Circuit High Voltage	P11C8	This diagnosis verifies Post Catalyst NOx Sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 2 heater reference pin (H-)	powershort on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	 > 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit	P11D0	This diagnosis verifies Post Catalyst NOx 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-	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Post Catalyst NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Post Catalyst NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 O2 Linear pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Engine Out NOx Sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window)	< -50.00 ppm > 80.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Engine Out NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a range Engine Out NOx Sensor	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 31,300,000,846,386,000.00 % > -31,300,000,846,386,000.00 % > 10.00 sec > 9,899,999,618,530,270.00 V TRUE < 100.00 % < 350.00 g/s > 0.00 g/s	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 200.00 g and Engine Out NOx signal is stable for at least 1.00 s. The NOx value used for the monitor is calculated after sampling up to 10.00 sampling windows (each one made up of 10.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature is within a range Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time Intake manifold absolute pressure No failure on intake manifold absolute pressure Sensor No electrical failure on NOx1 Sensor No current control failure on NOx1 Sensor No out of range low failure on NOx1 Sensor No out of range high failure on NOx1 Sensor No failure on NOx1 CAN communication No invalid data failure on NOx1 CAN frames	< 850.00 mg/s > -1.00 mg/s < 3,000.00 rpm > 600.00 rpm < 450.00 °C > -7.00 °C < 5.00 mm^3/s < 10,000,000,149,011,600.00 mm^3 > -1.00 mm^3 > 1.00 s < 1,000.00 kPa MAP_SensorFA==FALSE NOX_Snsr1_FltSt ==FALSE NOX_NOx1_StBitChkFlt ==FALSE NOX_NOx1_OutOfRngLoFlt ==FALSE NOX_NOx1_OutOfRngHiFlt		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2- Single DEF	P11D5	This diagnosis verifies if Post Catalyst 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 afterrun maneuver. The diagnosis result is the average value of a sampling window. The diagnosis result is processed with EWMA logic. A fault is detected if one of the following conditions is true: 1. EWMA filtered NOx raw average value OR 2. EWMA filtered NOx raw average value	 < -60 ppm > 80 ppm	No failure on upstream SCR temperature Sensor No failure on Vehicle Speed Sensor No failure on SCR system No failure on HC injector No failure on NOx Sensor Bus relay circuit No failure on downstream SCR HC model inputs No failure on DEF system No O2 plausibility in load fault on NOx2 No failure on NOx2 CAN communication No electrical failure on NOx2 Sensor No out of range low failure on NOx2 Sensor No out of range high failure on NOx2 Sensor No current control failure	EGT_TempSCR_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBR_RlyFA ==FALSE SCR_HC_SCR_DwnFlt ==FALSE SCR_DEFSysFlt_IUPR_DenDsbl ==FALSE OXY_NOx2ChkLoadFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE NOX_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLoFlt ==FALSE NOX_NOx2_OutOfRngHiFlt ==FALSE NOX_NOx2_StBitChkFlt	The monitor runs in afterrun, at 150 s after keyoff, once NOx2 Self Test diagnostic has been completed. The NOx value used for the monitor is calculated by sampling up to 100 samples. Once computed this value, the diagnostic provides a result. Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 1 test per trip are allowed Task = 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on NOx2 Sensor	==FALSE		
					No invalid data failure on NOx2 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE		
					Powertrain relay voltage	> 11.00 V		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	< 31,300,000,846,386,000.00 % > - 31,300,000,846,386,000.00 %		
					b) condition a) is fulfilled for time			
					Sensor supply in range	> 45 s		
					Sensor dewpoint is reached	> 9,899,999,618,530,270.00 V		
					c) Sensor signal status is valid	TRUE		
					d) condition c) is fulfilled for time	TRUE		
					Post Catalyst NOx Sensor is present in the exhaust	> 5 s		
					Engine is not cranking	TRUE		
					e) combustion mode dependent enabling flag	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					f) condition e) is fulfilled for time	**NOX_S2_OfstMntrEnblCmbMode**		
					g) engine speed	> 15 s		
					h) condition g) is fulfilled for time	> 0 rpm < 4,500 rpm		
					i) After injection pulse is not used for time	> 1 s		
					j) upstream SCR temperature is in range	> 0 s		
					k) exhaust mass flow is in range	> 200 °C < 450 °C		
					l) conditions j) k) are fulfilled for time	> 0 g/s < 400 g/s		
					m1) DEF1 injection is in range	> 60 s		
					m2) DEF2 injection (if present) is in range	>= 0 mg/s < 350 mg/s		
					m) conditions m1) m2) are fulfilled for time	>= 0 mg/s < 350 mg/s		
					n) duty cycle applied to the HC injector driver	> 1 s		
					o) condition n) is fulfilled for time	< 100 %		
					p) time between key off and last regen event	> 0 s		
					q) deceleration before keyoff	> 300 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled	< 25.00 m/s^2		
					s.1) vehicle speed in idle range			
					s.2) condition s.1) fulfilled for time	< 5 kph < 10 kph		
					t) idle before keyoff for a time	> 1 s		
					u) Upstream SCR temperatures derivative in range	< 2,600 s		
						< 3 °C/s		
					v) condition u) is fulfilled for a time			
					w) upstream SCR temperature derivative overcomes threshold	> 0 s		
						< 3 °C/s		
					x) condition w) has expired for a time			
					timers of conditions v), x) are reset when condition w) is verified	> 30 s		
					y1) debounce time after last DEF RDP event on first injector elapsed before keyoff	> 1 s		
					z) DEF system ready to inject			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					z1) Number of DPF regeneration events successfully completed after vehicle extis from assembly plant (SCR catayst de-greened);	TRUE >= 1		
					z2) condition z1) is used only if KeNOXD_b_S2_Ofst_SCR_GreenCond is True	KeNOXD_b_S2_Ofst_SCR_GreenCond = 1		
					A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well:			
					A1) alpha ratio	> 10.00		
					B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off	> 0 s		
					C) DEF strategy for emission reduction inhibition is not requested in case of DPF clogging	TRUE		
					Once all conditions above are fulfilled during the driving cycle, sensor raw signal average in a calibratable window is computed in afterrun when following conditions are fulfilled:			
					D) stabilization timer to trigger execution	> 150 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					E) NOx2 Self Diag execution has been completed	TRUE		

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 Post Catalyst NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit Low Voltage	P11D9	This diagnosis verifies Post Catalyst NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Post Catalyst NOx 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	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit	P11FC	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit Low Voltage	P11FD	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit High Voltage	P11FE	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Supply Circuit	P122B	This monitor checks if the Throttle DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit Shorted	P122C	This monitor checks if the Throttle commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	< 85.00 [%5V] OR > 94.00 [%5V] < 80.00 [%5V] OR > 100.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature - no faults present on coolant temperature sensor - outside air temperature - no faults present on outside air temperature sensor - PT relay supply voltage No faults present on Throttle position sensor, Throttle valve, Throttle position deviation. End Of Trip event has elapsed	== 1.00 >= 30.00 [°C] <= 150.00 [°C] ECT_Sensor_FA == FALSE >= -40.00 [°C] OAT_PtEstFiltFA == FALSE > 5.00 [V] TPS_PstnSnsrCktFlt== FALSE TPS_ActrFA == FALSE TPS_PstnDvtnFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Positive Voltage Control Circuit Shorted to Control Circuit	P1248	This DTC detects a shorted load on Injector 1	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Positive Voltage Control Circuit Shorted to Control Circuit	P1249	This DTC detects a shorted load on Injector 2	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Positive Voltage Control Circuit Shorted to Control Circuit	P124A	This DTC detects a shorted load on Injector 3	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Positive Voltage Control Circuit Shorted to Control Circuit	P124B	This DTC detects a shorted load on Injector 4	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Positive Voltage Control Circuit Shorted to Control Circuit	P124C	This DTC detects a shorted load on Injector 5	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Positive Voltage Control Circuit Shorted to Control Circuit	P124D	This DTC detects a shorted load on Injector 6	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Positive Voltage Control Circuit Shorted to Control Circuit	P124E	This DTC detects a shorted load on Injector 7	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Positive Voltage Control Circuit Shorted to Control Circuit	P124F	This DTC detects a shorted load on Injector 8	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	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 Shorted	P1407	This monitor checks if the HP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Current Range/ Performance	P140F	This monitor checks if an excessive current flows through the HP EGR DC-Motor (e.g. shunt circuit between load, HP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No faults present on HP EGR DC Motor current range/performance	EGR_MtrCurrLimTFTKO ==FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Shorted (ECB DC Motor)	P1413	This monitor checks if the HP EGR cooler bypass valve commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	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 System out of the cranking phase PT relay supply voltage in range No faults present on HP EGR Cooler Bypass DC Motor current range/ performance H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V] CEB_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.
Diesel Intake Air Flow Motor Overtemperature	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	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 Cooler Bypass Valve Supply Circuit (ECB DC Motor)	P1438	This monitor checks if the HP EGR cooler bypass DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	== 1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Supply Voltage Circuit High	P1473	This diagnosis detects a short to power on the soot sensor voltage supply line	Soot Sensor Control Unit supply voltage	> 17,299,999,237,060,500.00 V OR < 8,399,999,618,530,270.00 V	Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor	 NOT(SBR_RlyFA) NOT(U02A3)	Time counter: 11.00 consecutive failures OR 11.00 failures out of 40.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: Soot Sensor Electrode Voltage ON ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 24.00 consecutive failures OR 24.00 failures out of 96.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 supply voltage	 > 2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage OFF ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply IDE monitors that run during sensor regeneration have completed a report and 41 seconds had passed from that event (Diagnostic is enabled also prior the execution of the sensor regeneration)	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 23.00 consecutive failures OR 23.00 failures out of 92.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Shunt Circuit High Current	P147B	This diagnosis detects a no more efficient soot sensor	Soot Sensor Electrode raw current	> 6,699,999,809,265,140.00	Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Soot Sensor is in measurement phase or Shunt circuit diagnostic mode has been triggered Soot Sensor Electrode current measurement enabled Transmission fault with sensor control unit not present	 NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA) NOT(SOT_EleclFlt) NOT (SOT_SootSnsr_SrlFsFA)		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sesnor Sensing Element Internal Supply Circuit High Voltage	P1497	This diagnosis detects internal errors to the IDE Supply voltage (SCU internal error)	IDE Supply voltage signal	<= 4.7 V	Soot Sensor bus relay is commanded on No Electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA) NOT(P1473)	Time counter: 9.00 consecutive failures OR 9.00 failures out of 32.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Control Module Internal Supply Voltage Circuit	P1498	This diagnosis detects internal errors to the sensor Supply voltage (SCU internal error)	Sensor supply voltage (SRC Low voltage treshold) OR Sensor supply voltage (SRC High voltage treshold)	< 1.1 V > 4.9 V	Soot sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine is not in cranking phase	>(8.00) NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA)	Time counter: 4.00 consecutive failures OR 4.00 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.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used)	P2002	This diagnosis detects a cracked Diesel Particulate FIlter	{The soot sensor current filtered by using EWMA filter is} OR {The soot sensor current filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	> 12.00 > 12.00 DPF_1DK_ModelNotVld ===TRUE	Test enabled by calibration Ignition voltage in range for a time Engine running or engine cranking or in auto-stop phase No faults on soot sensor and faults which inhibit sensor to stay in measurement Engine out soot model realiable Note: the not reliability shall be verified for 1 s before to be declared No faults on downstream DPF temperature sensor or model No faults on downstream DPF mass airflow No faults on engine out soot model Ambient temperature	1.00 ==TRUE > 0.00 [s] ==TRUE SOT_SootSnsrFlt ==FALSE EXM_PM_TurbFlowNotRlb ==FALSE SOT_ExhTempSootSnsrVld ==TRUE SOT_TotExhSootSnsrVld ==TRUE SOT_PM_DPF_UpFlt ==FALSE > -20.00 [°C]	Test per Trip: 1. If Fast Initial Response (FIR) mode is active then 2.00 tests per trip are allowed. If Rapid Response (RR) mode is active then 2.00 tests per trip are allowed. The signal for the monitor check is filtered by means of a first-order filter. The filter step change can assume the following values: - 8,999,999,761,581,420.00 if FIR is active - 10,599,999,874,830,200.00 if RR is active - 3,700,000,047,683,720.00 if neither FIR nor RR are active.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					During sensor measurement phase, Number of Autostop events	< 20.00 [Cnt]	Initial filter value: - 12.00 when FIR is activated - 0.00 when RR is activated	
					During sensor measurement phase, Duration of Autostop phase	< 200.00 [s]		
					During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is	<= 150.00 [mm^3]		
					EWMA filter is enabled AND number of diagnostic run for driving cycle is	1.00 ==TRUE < 1 (when FIR and RR are not active) < 1.00 (when FIR is active) < 1.00 (when RR is active) NOT (INM_EGR_RateNotVld)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DPF over-temperature	P200C	This safety related monitor reacts to over-temperature in downstream DPF position.	Downstream DPF sensed temperature	> 800.00 [°C]	Test enabled by calibration and with battery voltage in range and with engine running and with no fault on downstream DPF temperature sensor	1.00 == TRUE == TRUE EGT_SnsrDPF_DwnFlt	300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Downstream DPF sensed temperature	> 900.00 [°C]	Test enabled by calibration and with battery voltage in range and with engine running and with no fault on downstream DPF temperature sensor	1.00 == TRUE == TRUE EGT_SnsrDPF_DwnFlt	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Close-coupled DOC over-temperature	P200E	This safety related monitor reacts to over-temperature in downstream close-coupled DOC position.	Downstream ccDOC sensed temperature	> 800.00 [°C]	Test enabled by calibration and with battery voltage in range and with engine running and with no fault on downstream ccDOC temperature sensor	1.00 == TRUE == TRUE EGT_SnsrCatDwnFlt	300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Downstream ccDOC sensed temperature	> 900.00 [°C]	Test enabled by calibration and with battery voltage in range and with engine running and with no fault on downstream ccDOC temperature sensor	1.00 == TRUE == TRUE EGT_SnsrCatDwnFlt	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring Low	P2032	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** The monitor compares the EGT 2 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 2 raw value (temperature value) with a minimum threshold;	< 1.00 [Ohm] < -7,280,000,305,175,7 80.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples ove 25.00 rsamples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring High	P2033	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 2 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a maximum threshold;	> 100,000,000.00 [Ohm] > 12,898,499,755,859,400.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2080	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor1_Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	> 7,200.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S1_FA		
					No quick change fault	EGT_QED_B1S1_FA		
					no out of range high fault	EGT_CED_B1S1_HiFA		
					no out of range low fault	EGT_CED_B1S1_LoFA		
					no lost of comm fault	EGT_CED_B1S1_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 1 quick change monitoring	P2081	This function has the purpose of warning the system/driver that EGT 1 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [°C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault s affecting the sensor AND Unfitered temperatature value AND	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas1_Flt >= 140.00 <= 1,070.00 ==TRUE	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 2	P2084	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor2 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	> 7,200.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S2_FA		
					No quick change fault	EGT_QED_B1S2_FA		
					no out of range high fault	EGT_CED_B1S2_HiFA		
					no out of range low fault	EGT_CED_B1S2_LoFA		
					no lost of comm fault	EGT_CED_B1S2_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 2 quick change monitoring	P2085	This function has the purpose of warning the system/driver that EGT 2 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas2_Flt >= 140.00	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND A calibratable delay time for the sensor initialization shall be elapsed	<= 1,070.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 1 Low Voltage	P2147	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage high across High Side Driver of bank 1 (injector 1 and 4) during On state indicates short to ground	impedence between HS pin of injector 1 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderA OR FUL_OutEnblCyl_CiEPSR_CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR_CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 1 High Voltage	P2148	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage low across High side drive of bank 1 (injector 1 and 4) during off state indicates short to power	impedence between HS pin of injector 1 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderA OR FUL_OutEnblCyl_CiEPSR_CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR_CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2 Low Voltage	P2150	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage high across High Side Driver of bank 2 (injector 2 and 5) during On state indicates short to ground	impedence between HS pin of injector 2 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderB OR FUL_OutEnblCyl_CiEPSR_CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR_CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2 High Voltage	P2151	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage low across High side drive of bank 2 (injector 2 and 5) during off state indicates short to power	impedence between HS pin of injector 2 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderB OR FUL_OutEnblCyl_CiEPSR_CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR_CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 3 Low Voltage	P2153	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage high across High Side Driver of bank 3 (injector 6 and 7) during On state indicates short to ground	impedence between HS pin of injector 6 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderG OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 3 High Voltage	P2154	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage low across High side drive of bank 3 (injector 6 and 7) during off state indicates short to power	impedence between HS pin of injector 6 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderG OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 4 Low Voltage	P2156	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage high across High Side Driver of bank 4 (injector 3 and 8) during On state indicates short to ground	impedence between HS pin of injector 3 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderH OR FUL_OutEnblCyl_CiEPSR_CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR_CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 4 High Voltage	P2157	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage low across High side drive of bank 4 (injector 3 and 8) during off state indicates short to power	impedence between HS pin of injector 3 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderH OR FUL_OutEnblCyl_CiEPSR_CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR_CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2201	This diagnosis verifies that Engine Out NOx Sensor embedded current control circuit status is healthy	Check if the NOx1 Sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta Ip0 < 300 uA /10 msec b) Delta Ip1 < 2.34 uA around its set point > 5.00 % > 5.00 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx1 Sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE TRUE < 31,300,000,846,386,000.00 % >- 31,300,000,846,386,000.00 % > 10.00 sec TRUE NOX_Snsr1_FltSt ==FALSE **NOX_S1_StBitChkEnblCmbMode**	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.
						<= 35.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec FALSE		

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 Engine Out NOx sensor read out of range low	Check if the NOx1 sensor NOx concentration raw read is out of lower range: NOx raw read	< -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag No invalid data failure on NOx1 CAN frames	> -1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A == FALSE > 9,899,999,618,530,270.00 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMinCmbMode** CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit High Bank 1 Sensor 1	P2203	This diagnosis verifies Engine Out NOx Sensor read out of range high	Check if the NOx1 Sensor NOx concentration raw read is out of higher range: NOx raw read	 > 2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 Sensor No electrical failure on NOx1 Sensor Combustion mode dependent enabling flag Engine running for a time longer than No invalid data failure on NOx1 CAN frames Air system control is active	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A == FALSE > 9,899,999,618,530,270.00 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_FltSt ==FALSE **NOX_S1_OutRngMaxCmbMode** 0.00 s CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE TRUE	Time counter: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit	P2205	This diagnosis verifies Engine Out NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Engine Out NOx Sensor Heater Control pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit High Voltage	P2207	This diagnosis verifies Engine Out NOx Sensor Heater Supply pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit	P2208	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 1	P2209	This diagnosis verifies if the Engine Out NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Engine Out NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	 > 31,300,000,846,386,000.00 <- 31,300,000,846,386,000.00	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_A NOx Sensor Bus relay is commanded ON Delay timer once sensor supply is in range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V FALSE TRUE > 45 sec > 180 sec > 5 sec **NOX_S1_HtrPerfEnblCmbMode** > 0 sec FALSE	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 Engine Out Nox Sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage < 9,899,999,618,530,270.00 V	Engine is running Powertrain relay voltage NOx Sensor Bus relay is commanded ON a) NOx Sensor Dewpoint is reached b) condition a) shall be fulfilled for time CAN_LostComm_FltN_BusB_NOxSnsr_A CAN_InvalidDataFlt_BusB_NOxSnsr_A	TRUE > 11.00 V TRUE TRUE > 0 sec FALSE FALSE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	This diagnosis verifies if the supply voltage of the Post Catalyst NOx Sensor is out of range	Check if NOxSensor 2 supply voltage status is out of range	Sensor supply voltage < 9,899,999,618,530,270.00 V	Engine is running	TRUE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx Sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	> 0 sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					CAN_InvalidDataFlt_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 Engine Out NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 Heater Sense pin (HTemp)	groundshort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit High Voltage	P2211	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply NOx Sensor 1 Heater Sense pin (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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)	< 4,000,000,189,989,810.00 [kPa/(l/s)]	Test enabled by calibration	1.00 ==TRUE	200.00 failures over 220.00 samples Function task: 100 ms	Type B, 2 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt ==FALSE		
					No fault on upstream DPF temperature estimated (model)	EGT_TempDPF_UpFlt ==FALSE		
					No fault on air flow meter	MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					DPF status in soot loading phase (no regeneration ongoing)	DPF_DPF_St == CeDPFR_e_SootLoading		
					Engine speed	> 800.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA ==FALSE		
						> 100.00 [l/s] for > 10.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> -2.00 [Pct] AND < 400.00 [Pct] > 200.00 [DegC] AND < 500.00 [DegC] for > 240.00 [s]		
					Soot trapped in the DPF estimated by statistical model	> 40.00 [DegC] ==TRUE > -20.00 [DegC] < 50.00 [%]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> **Lo_FR_MontrEnblLoThrsh** [mm^3] AND < **Lo_FR_MontrEnblHiThrsh** [mm^3] for > 2.00 [s] ==TRUE		
					Engine Coolant Temperature			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR OBD Coolant Enable Criteria	-2.00 [Pct] < Soot < 400.00 [Pct]		
					Ambient Temperature			
					Correction of CCB model			
					The fuel request is between two thresholds for a minimum calibrateable time			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2297	This DTC aims to detect a drift of measured O2 value (A) from an estimated concentration (B) when the latter can be considered stable during overrun condition.	(A - B) in overrun condition is out of plausible range	> 5.00 [%] < -5.00 [%]	Engine running System voltage in range Sensor is fully operative Diagnosis runs in overrun when SQP learning is enabled if KeOXYD_b_NOx1_PlausOvrrnEnbl_SQP OR Diagnosis runs if KeOXYD_b_NOx1_PlausOvrrnEnbl_SQP AND No SQP learning is active Enabled in combustion mode No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	> 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE ==TRUE (1.00) ==FALSE (1.00) FAD_SQA_LrnET_Enbl == FALSE refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**) < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdlFlt OXY_NOx1SignRngChkFlt	Time counter: (140 +1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FHP_InjLeakageFA EGR_PstnShtOffReqFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) (MAP_SensorFA AND MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 35.00 [s]		
					a. Engine speed in operating range	> 800 [rpm] < 3,000 [rpm]		
					b. EGR position	< 100.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 200.00 [mg] < 1,800.00 [mg]		
					Estimated O2 concentration stable i.e. difference between initial and actual value	< 5.00 [%]		
					Air mass flown since fuel cut-off condition	> 30,000,001,192,092,900.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 2	P229F	This diagnosis verifies that Post Catalyst NOx Sensor embedded current control circuit status is healthy	Check if the 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: TOTAL_time= ON_time+OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta Ip0 < 300 uA /10 msec b) Delta Ip1 < 2.34 uA around its set point > 5.00 % > 5.00 %	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 O2 plausibility in load fault on NOx2 No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE TRUE < 31,300,000,846,386,000.00 > - 31,300,000,846,386,000.00 > 10.00 sec TRUE OXY_NOx2ChkLoadFlt == FALSE NOX_Snsr2_FltSt ==FALSE **NOX_S2_StBitChkEnblCmbMode**	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.
					b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_B	<= 35.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Post Catalyst NOx Sensor read out of range low	Check if the NOx2 Sensor NOx concentration raw read is out of lower range: NOx raw read	 < -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 Sensor No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag No O2 plausibility in load fault on NOx2 No invalid data failure on NOx2 CAN frames	> -1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B == FALSE > 9,899,999,618,530,270.00 V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_FltSt ==FALSE **NOX_S2_OutRngMinCmbMode** OXY_NOx2ChkLoadFlt ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	This diagnosis verifies Post Catalyst NOx Sensor read out of range high	Check if the NOx1 Sensor NOx concentration raw read is out of higher range: NOx raw read	 > 2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 Sensor No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag No O2 plausibility in load fault on NOx2 Engine running for a time longer than No invalid data failure on NOx2 CAN frames One of the following conditions is fulfilled (OR logic): a) Air system control is active b) DEF system is ready to	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B == FALSE > 9,899,999,618,530,270.00 V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_FltSt ==FALSE **NOX_S2_OutRngMaxCmbMode** OXY_NOx2ChkLoadFlt ==FALSE > 0 s CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE TRUE	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.
					inject and DEF strategy for emission reduction inhibition is not requested in case of DPF clogging	TRUE		

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 Post Catalyst NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit Low Voltage	P22A4	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense Circuit	P22A6	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 2	P22A7	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	 < 31,300,000,846,386,000.00 >- 31,300,000,846,386,000.00	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_B NOx Sensor Bus relay is commanded ON Delay timer once Sensor supplyisin range (> 10.8 V) Delay timer once Sensor dewpoint is reached Delay timer once engine is overrun a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V FALSE TRUE > 45 sec > 180 sec > 5 sec **NOX_S2_HtrPerfEnblCmbMode** > 0 sec FALSE	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 Post Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Sense pin (HTemp)	groundshort on HTemp	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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 Post Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	> 11.00 V TRUE FALSE > 9,899,999,618,530,270.00 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type 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	< -6.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx2_O2_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	> 29.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs		Time counter: 100 failures out of 200 samples. Time task 25 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 1	P22FB	This diagnosis verifies the plausibility of Engine Out NOx Sensor signal	Check if (Engine Out NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -40 % OR > 40.00 %	Engine is running Powertrain relay voltage No failure on any NOx model inputs No failure on NOx1 CAN communication No invalid data failure on NOx1 CAN frames No electrical failure on NOx1 Sensor No out of range low failure on NOx1 Sensor No out of range high failure on NOx1 Sensor No current control failure on NOx1 Sensor No failure on outside air temperature Sensor No failure on ambient air temperature Sensor no falut on upstream catalyst exhaust pressure model inputs No failure on engine	TRUE > 11.00 V EXM_NOxMdl_ExhMnfdNotVld ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE NOX_Snsr1_FltSt ==FALSE NOX_NOx1_OutOfRngLoFlt ==FALSE NOX_NOx1_OutOfRngHiFlt ==FALSE NOX_NOx1_StBitChkFlt ==FALSE OAT_PtEstFiltFA ==FALSE AmbPresDfltdStatus ==FALSE EGP_PresCatUpFlt ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 1 test per trip are allowed The signal for the monitor check is calculated at first collecting and averaging 200.00 samples, than filtering the resulting mean value by means of a first-order filter. The filter gain calibration (1) can assume the following values: - 6,000,000,238,418,580.00 if FIR is active - 6,000,000,238,418,580.00 if RR is active -	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coolant temperature Sensor No failure on injectors No failure on high pressure fuel rail system No failure on intake manifold absolute pressure Sensor Modeled Engine Out NOx concentration Steady state detection: a) Modeled Engine Out NOx concentration step at 100 ms. b) condition a) is fulfilled for time Ambient air pressure Outside air temperature Combustion mode dependent enabling flag Intake manifold absolute pressure Injection fuel quantity requested	ECT_Sensor_FA ==FALSE FUL_GenericInjSysFlt ==FALSE FHP_InjLeakage ==FALSE MAP_SensorFA==FALSE > 150 ppm < 20 ppm > 3.00 sec > 72 kPa < 200 kPa > -9 °C < 80 °C **NOX_S1_PlausChkEnblCmbMode** < 250 kPA For normal combustion mode: > 35.00 mm^3 < 60.00 mm^3	2,199,999,988,079,070.00 if neither FIR and RR are active (1) The EWMA filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed Engine coolant temperature Sensor dewpoint is reached DFCO by-pass not enabled Diagnostic test results during EWMA FIR mode	For other combustion modes: > 35 mm^3 < 60 mm^3 For normal combustion mode: > 1,500 rpm < 2,100 rpm For other combustion modes: > 1,500 rpm < 2,100 rpm > 70 °C < 129 °C TRUE TRUE < 1		

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 Post Catalyst NOx Sensor sensing cells integrity during afterrun	Check if there is any clogging in the Post Catalyst NOx Sensor measurement cavities that could result in reduced NOx-sensitivity. The Sensor internal operating current set-points are changed such way, that the 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.	> 160 % OR < 70 %	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 invalid data failure on NOx2 CAN frames No failure on NOx1 Sensor No failure on O2 from NOx1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on exhaust temperature Sensor (downstream SCR) No failure on HC injector No failure on Vehicle Speed Sensor	NOX_Snsr2_ElecFA ==FALSE NOX_NOx2_OutOfRngLoFlt ==FALSE NOX_NOx2_OutOfRngHiFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE NOX_Snsr1_NOx_Flt ==FALSE OXY_NOx1_O2_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed Task=500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on any input of SCR chemical model No current control failure on NOx2 Sensor No O2 plausibility in load fault on NOx2 Powertrain relay voltage NOx2 sensor supply in range NOx2 sensor dewpoint is reached (NOx2 Sensor heater raw resistance - NOx2 Sensor heater target resistance) / NOx2 Sensor heater target resistence a)combustion mode dependent enabling flag b) condition a) is fulfilled for time c) engine speed d) condition c) is fulfilled for time e) After injection pulse is not used for time f) exhaust temperature Sensor (downstream	SCR_ChemicalMdlFlt ==FALSE NOX_NOx2_StBitChkFlt ==FALSE OXY_NOx2ChkLoadFlt ==FALSE > 11.00 V > 9,899,999,618,530,270.00 V TRUE < 31,300,000,846,386,000.00 % >- 31,300,000,846,386,000.00 % **NOX_NOx2SelfTstEnblCmbMode** > 0 sec > 0 rpm < 1,500 rpm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR) g) exhaust mass flow h) conditions f) g) are fulfilled for time j) O2 concentration from NOx1 k) NOx concentration from NOx1 i) conditions j) k) are fulfilled for time l) duty cycle applied to the HC injector driver m) condition l) is fulfilled for time n) time between key off and last overrun o) time between key off and last DPF regen p) engine speed in idle range q) fuel request in idle range r) conditions p) q) is fulfillled for time s) timer of condition r) is reset if one of the following condition is fulfilled (idle off recognition - t)	> 1 sec > 0 sec > -20 °C < 500 °C < 40 g/s > 5 sec > 10 % < 300 ppm > 0 sec < 1 % > 5 sec > 15 sec > 15 sec < 800 rpm < 20 mm^3 < 1,800 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					conditions): s.1) exhaust temperature (downstream SCR) s.2) condition s.1) is fulfilled for time (once idle has been detected) s.3) vehicle speed s.4) condition s.3) is fulfilled for time (once idle has been detected) s.5) exhaust mass flow s.6) condition s.5) is fulfilled for time (once idle has been detected) t) HC mass flow (SCR downstream) Once t) condition is fulfilled the following additional t.x) conditions shall be fulfilled to enable the monitor (AND logic) t.1) exhaust temperature (downstream SCR) t.2) condition t.1) is fulfilled for time (once condition t) has been detected) t.3) vehicle speed t.4) condition t.3) is	> 180 °C > 5 sec > 5 mph > 5 sec > 40 g/sec > 5 sec < 40 g/s > 180 g/s > 20 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					fulfilled for time (once condition t) has been detected)	>= 5 mph		
					t.5) exhaust mass flow	> 10 sec		
					t.6) condition t.5) is fulfilled for time (once condition t) has been detected)	> 20 g/s		
						> 5 sec		
					u) deceleration before keyoff.			
					v) condition u) could be ignored if idle engine condition v.x) is fulfilled	< 5.00 m/s^2		
					v.1) engine speed in idle range			
					v.2) condition v.1) fulfilled for time	< 1.00 rpm < 10.00 rpm		
					w) DFCO by-pass not enabled	> 2,600.00 s		
					Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off when following conditions are fulfilled:	TRUE		
					x) O2 stabilization timer	> 30.00 s		
					y) O2 concentration from NOx2	> -1,000.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 3	P242B	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor3 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	> 10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S3_FA		
					No quick change fault	EGT_QED_B1S3_FA		
					no out of range high fault	EGT_CED_B1S3_HiFA		
					no out of range low fault	EGT_CED_B1S3_LoFA		
					no lost of comm fault	EGT_CED_B1S3_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring Low	P242C	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** The monitor compares the EGT 3 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 3 raw value (temperature value) with a minimum threshold;	< 1.00 [Ohm] < -7,280,000,305,175,780.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring High	P242D	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 3 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 3 raw value (temperature value) with a maximum threshold;	> 100,000,000.00 [Ohm] > 12,898,499,755,859,400.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status loss comunication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail 25.00 samples over samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 3 quick change monitoring	P242E	This function has the purpose of warning the system/driver that EGT 3 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas3_Flt >= 140.00 <= 1,070.00	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooling System Performance (OBDII market only) (non-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).	< 69.00 [%]	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet PT Relay voltage in range Engine is running or cranking HP EGR cooler upstream temperature in range Ambient Temperature Ambient pressure Air Control is Active Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature HP EGR Cooler bypass	1.00 ==TRUE ==TRUE Powertrain relay voltage > 11.00 [V] ==TRUE > 450.00 [°C] < 740.00 [°C] >= -20.00 [°C] >= 695,999,984,741,211.00 [kPa] Refer to "Air Control Active" Free Form > 70.00 [°C] ==TRUE < 130.00 [°C]	Test executed after 225.00 samples are collected and their average is computed functional task 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for a time	> 8.00 [s]		
					Time after combustion mode change	> 4.00 [s]		
					HP EGR filtered flow in range	< **P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s] > **P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s]		
					for a time	>= **P2457: Minimum time for HP EGR cooler efficiency monitor enabling** [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	< 3,100.00 [rpm] > 800.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		
					No fault on HP EGR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					cooler downstream temperature sensor No fault on Ambient Temperature sensor No fault on ambient pressure sensor No fault on engine coolant temperature sensor No fault on engine speed No fault on HP EGR Cooler Bypass	CET_DNSS_FA==FALSE OAT_PtEstFiltFA ==FALSE AAP_AmbientAirPresDfltd ==FALSE ECT_Sensor_FA ==FALSE CrankSensor_FA ==FALSE 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	P2459	This diagnostic detects a too high DPF regeneration frequency due to inefficient combustion, inefficient regeneration, soot overestimated by models or leaks in the exhaust or the intake line. When a new regeneration is started, the diagnostic computes a ratio between the soot level estimated by the model that has triggered the regeneration and the soot level estimated by the Nominal Engine Out soot model, which gives information about the expected soot level in the DPF. If the ratio is greater than a threshold, the diagnostic will report a fail. In case the regeneration is started based on miles travelled or time passed since last regeneration, the diagnostic will always report a pass. The test results can be optionally filtered by an EWMA filter.	When the regeneration is started by the Ranked soot model, the ratio between the soot level from that model and the soot level estimated by the Nominal engine out model is calculated. Monitor configuration: *EWMA Enable* = 0.00 **a)** In case of EWMA filter not enabled (*EWMA Enable* == 0), the calculated ratio is **b)** In case of EWMA filter enabled (*EWMA Enable* == 1), the calculated ratio is OR, if a P2459 fault is already active, the calculated ratio is	>= 1,000.00 >= 149,399,995,803,833.00 >= 149,399,995,803,833.00	Test enabled by calibration A new DPF regeneration is started The number of regenerations completed successfully is The previous regeneration was completed successfully The regeneration is started by the Ranked soot model, distance or time criteria (in the case of distance and time the ranked model percentage must be greater than a calibratable threshold) The regeneration is requested at service The regeneration is requested in advance due to a failure condition The Ranked soot model was valid for the whole duration of the soot loading phase	1.00 == TRUE > 1.00 == TRUE == TRUE (> 0.00) == FALSE == FALSE DPF_RankedModelNotVld EXM_PM_TurbFlowNotVld_2 = FALSE > 11.00 V	No time required, the malfunction criteria are evaluated as soon as a new DPF regeneration is started. Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						< 255.00 mm3/s		
					The nominal engine out soot model was valid for the whole duration of the soot loading phase	< 74.00		
					Run/Crank voltage in range	< -50.00		
					Extreme transient engine operation was not detected, i.e. the delta fuel request during the soot loading time was			
					During the previous regeneration more than 50 % of the time was not spent at ambient pressure			
					During the previous regeneration the cumulative elevation gain is			

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) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P245B	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Cooler Bypass Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 13.00 [%]	Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation) HP EGR Cooler Bypass position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system	== 1.00 > 11.00 [V] CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE < 160.00 [%/s] > -160.00 [%/s] for >= 4.00 [s] >= 55.00 [°C]	1,280.00 fail counts out of 1,600.00 sample counts 640.00 fail counts to enable the open circuit check (P245A) 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.
					target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Low (ECB DC Motor)	P245C	This monitor checks if the HP EGR cooler bypass valve commands are shorted to ground	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	== 1.00	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			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit 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	== 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			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Soot Accumulation	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	(Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St = CeDPFR_e_SootLoading) (Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St != CeDPFR_e_SootLoading) Soot model based on Delta pressure measure plus configurable correction block (CCB)	 > 140.00 [Pct] > 160.00 [Pct]	Test enabled by calibration No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality; if not present, no fault on downstream catalyst temperature sensor) with the exception of the fault on downstream DPF temperture sensor No fault on air flow meter No fault on atmospheric pressure sensor Engine speed No fault on exhaust mass flow estimation	1.00 ==TRUE EGP_DiffPresSnsrFlt ==FALSE EGT_SnsrDPF_UpFlt ==FALSE (if sensor not present, EGT_SnsrCatDwnFlt ==FALSE) Exception: above condition ==TRUE AND EGT_SnsrDPF_DwnFlt ==TRUE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 800.00 [rpm] EXF_TotExhDPF_UpFA ==FALSE > 70.00 [l/s]	If DPF_DPF_St = CeDPFR_e_SootLoading 120.00 failures over 150.00 samples elseif DPF_DPF_St != CeDPFR_e_SootLoading 120.00 over 150.00 samlples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	for > 2.00 [s]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> 0.00 [DegC] AND < 700.00 [DegC] for > 5.00 [s]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> -40.00 [DegC] ==TRUE		
					Ambient Temperature	> -40.00 [DegC]		
					Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time	> = 20,000,000,298,023,200.00 % of the soot loading		
					Soot model based on Delta Pressure is always valid for a time	>= 5.00 s		
					Icing risk for delta pressure sensor's pipes is low	== TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 4	P246F	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor4 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	> 10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S4_FA		
					No quick change fault	EGT_QED_B1S4_FA		
					no out of range high fault	EGT_CED_B1S4_HiFA		
					no out of range low fault	EGT_CED_B1S4_LoFA		
					no lost of comm fault	EGT_CED_B1S4_LostCommFA		
					no fault affected engine not run timer AND	==TRUE		
					A calibratable delay time	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for the sensor initialization shall be elapsed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring Low	P2470	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** The monitor compares the EGT 4 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT4 raw value (temperature value) with a minimum threshold;	< 1.00 [Ohm] < -7,280,000,305,175,780.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring High	P2471	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 4 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 4 raw value (temperature value) with a maximum threshold;	> 100,000,000.00 [Ohm] > 12,898,499,755,859,400.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 4 quick change monitoring	P2472	This function has the purpose of warning the system/driver that EGT 4 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas4_Flt >= 140.00 <=	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND A calibratable delay time for the sensor initialization shall be elapsed	1,070.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring Low	P2481	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 5 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 4 raw value (temperature value) with a minimum threshold;	< 1.00 [Ohm] < -7,280,000,305,175,780.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring High	P2482	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog seonsor:** The monitor compares the EGT 5 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 5 raw value (temperature value) with a maximum threshold;	> 100,000,000.00 [Ohm] > 12,898,499,755,859,400.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust gas temperature sensor (EGT) 5 quick change monitoring	P2484	This function has the purpose of warning the system/driver that EGT 5 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas5_Flt >= 140.00 <= 1,070.00 ==TRUE	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop DPF Regeneratio n Control At Limit - Temperature Too Low	P24A0	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic.	**LowTemperature monitoring (Positive Deviation):** **(c1)** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	 > 100.00 [degC]	Test enabled by calibration flag Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DOC downstream temperature sensor (only SCR forward architectures) No Fault on DPF upstream temperature model (only SCRF architectures) No Fault on DPF upstream temperature sensor (only DPF forward architectures) No Fault on ambient temperature sensor (only SCR forward	1.00 [Boolean] ==TRUE DPF_DPF_St== Warm_Up EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] ==FALSE EGT_SnsrCatDwnFlt [Boolean] ==FALSE EGT_TempDPF_UpFlt [Boolean] ==FALSE EGT_SnsrDPF_UpFlt [Boolean] ==FALSE OAT_PtEstFiltFA [Boolean] ==FALSE	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.
					architectures)			
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd [Boolean] ==FALSE AND AAP_AmbPresSnsrTFTKO [Boolean] ==FALSE		
					Combustion mode different from LNT Desox Lean and LNT Engine Protection	==TRUE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF_TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 250.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					least a timer			
			Low Temperature monitoring (Positive Deviation):		Test enabled by calibration flag	1.00 [Boolean] ==TRUE	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	> 100.00 [degC]	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state		
					DPF temperature closed loop control shall be enabled	EGT_DsblCL == Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean] ==FALSE		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGT_TempDPF_UpFlt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature sensor (only DPF forward architectures)	EGT_SnsrDPF_UpFlt [Boolean] ==FALSE		
					No Fault on ambient	OAT_PtEstFiltFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature sensor (only SCR forward architectures)	[Boolean] ==FALSE		
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd [Boolean] ==FALSE AND AAP_AmbPresSnsrTFTKO [Boolean] ==FALSE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF_TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 250.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at least a timer	> 75.00 [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	P24A1	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring runs only in DPF steady state logic.	**Hi Temperature monitoring (Negative Deviation):**		Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples	Type B, 2 Trips
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	< -100.00 [degC]	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state	Function task: 100ms	
					DPF temperature closed loop control shall be enabled	EGT_DsblCL== Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGT_TempDPF_UpFlt [Boolean]		
					No Fault on DPF upstream temperature	EGT_SnsrDPF_UpFlt [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					sensor (only DPF forward architectures)			
					No Fault on ambient temperature sensor (only SCR forward architectures)	OAT_PtEstFiltFA [Boolean]		
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTKO [Boolean]		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF_TempDeviation** [Boolean]		
					Exhaust mass flow	< 250.00 [g/s]		
					AND Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					Time in which the system	<= 30.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is in cut off			
					All the above enabling conditions are met for at least a timer	> 75.00 [sec]		

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 has to be replaced	(Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St = CeDPFR_e_SootLoading) (Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St != CeDPFR_e_SootLoading) Soot model based on Delta pressure measure plus configurable correction block (CCB) Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 350.00 [Pct] > 400.00 [Pct]	Test enabled by calibration No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality; if not present, no fault on downstream catalyst temperature sensor) with the exception of the fault on downstream DPF temperture sensor No fault on air flow meter No fault on atmospheric pressure sensor Engine speed No fault on exhaust mass flow estimation	1.00 ==TRUE EGP_DiffPresSnsrFlt ==FALSE EGT_SnsrDPF_UpFlt ==FALSE (if sensor not present, EGT_SnsrCatDwnFlt ==FALSE) Exception: above condition ==TRUE AND EGT_SnsrDPF_DwnFlt ==TRUE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 800.00 [rpm] EXF_TotExhDPF_UpFA ==FALSE > 70.00 [l/s]	If DPF_DPF_St = CeDPFR_e_SootLoading 20.00 failures over 40.00 samples elseif DPF_DPF_St != CeDPFR_e_SootLoading 20.00 failures over 40.00 samples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	for > 2.00 [s]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> 0.00 [DegC] AND < 700.00 [DegC] for > 5.00 [s]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> -40.00 [DegC] ==TRUE		
					Ambient Temperature	> -40.00 [DegC]		
					Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time	> = 20,000,000,298,023,200.00 % of the soot loading		
					Soot model based on Delta Pressure is always valid for a time	>= 5.00 s		
					Icing risk for delta pressure sensor's pipes is low	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Stuck (ECB DC Motor)	P24A5	This monitor detects the HP EGR Cooler Bypass mechanically stuck in a certain position different from its defaulted position (fully closed, cooling mode) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR Cooler Bypass position > maximum threshold (not cooling position)	> 15.00 [%]	P245B is already set		No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the vanes in their defaulted position)	> 1.00 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation)	CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Circuit Range/ Performance	P24AF	This diagnosis detects a soot sensor memory corruption	Soot sensor state machine command (ECM) is different from SCU feedback		Soot Sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Transmission fault with sensor control unit not present Soot sensor state machine command is different from initialization state or error state Time between states transition	> 1.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P30BC) > 120.00	Time counter: 160.00 failures out of 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.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	< 12,999,999,523,162,800.00	Soot Sensor bus relay is commanded on			Type B, 2 Trips
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT (SOT_SootSnsr_SrlLcFA)		
					No Electrical faults present on Soot Sensor	NOT(SOT_EleclFlt)		
					Soot Sensor is in regeneration phase			
					Soot Sensor Electrode current measurement enabled			
					Transmission fault with sensor control unit not present	NOT (SOT_SootSnsr_SrlFsFA)		
					Sensor is commanded in a regeneration state			

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: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply IDE Temperature is lower than In case of overthreshold event the diagnostic will be re-enabled by passing (hysteresis)	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473) 550.00 500.00	Time counter: 24.00 consecutive failures OR 24.00 failures out of 92.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Number of SCG error events	I < 0.5 A OR I > 15 A > 100	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	> 0 % NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 9.00 consecutive failures OR 9.00 failures out of 32.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 output voltage OR Soot Sensor Heater switch input (off state) OR Soot Sensor Heater switch current in PWM OFF state	 > 6 V in PWM OFF state = 1 0.5 A < I < 15 A	Soot Sensor Control Unit conditions: No conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 25.00 consecutive failures OR 24.00 failures out of 96.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Exceeded Learning Limit (analog position sensor)	P24C4	This monitor checks if the HP EGR cooler bypass position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (cooling position and bypass position)	analog position raw voltage when the valve is in cooling position < low threshold OR analog position raw voltage when the valve is in cooling position > high threshold OR analog position raw voltage when the valve is in bypass position < low threshold OR analog position raw voltage when the valve is in bypass position > high threshold	< 16.00 [%5V] OR > 24.00 [%5V] OR < 60,900,001,525,878,900.00 [%5V] OR > 914,000,015,258,789.00 [%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 >= 30.00 [°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 removed from the exhaust line, a soot sensor temperature sensor damaged or a possible parasitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit.	The absolute value of the difference between the Soot Sensor Electrode and the electrode temperature model	> 100.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No electrical fault detected on Soot Sensor Soot Sensor heater is not commanded Soot Sensor is in measurement operating status Exhaust gas temperature model is valid	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd AND NOT (VehicleSpeedSensor_FA)	Time counter: 250.00 failures out of 255.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas temperature model is reliable, i.e.: (Ambient air pressure Ambient air temperature Exhaust gas volumetric flow at soot sensor) Time after sensor regeneration Temperature estimated by the sensor probe temperature model - Electrode temperature	> 70.00 kPa > -20.00 °C > 50.00 mg/s > 300.00 s OR > 100.00 °C > 100.00 °C NOT(P30BC) > 300.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Temperature estimated by the sensor probe temperature model - Outside air temperature Transmission fault with sensor control unit not present Heating during measurement is not active or heater off condition			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Temperature Circuit High	P24C9	This diagnosis detects a short to power or an open circuit on the soot sensor temperature signal	Diagnosis executed in Soot Sensor Control Unit: Voltage of Soot Sensor temperature meander (TM) signal Soot Sensor Temperature meander (TM) refernce voltage signal	< 0.3 V OR > 3.5 V < 4.5 V	Soot Sensor Control Unit conditions: No conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 24.00 consecutive failures OR 24.00 failures out of 96.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Regeneratio n Incomplete	P24D1	This diagnosis detects a degradation of the soot sensor heater	the Soot Sensor Electrode Temperature is during the steady state soot sensor regeneration, for a consecutively time	<= (725.00 - 10.00)°C < 43.00 s	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Volumetric flow estimation is valid The power ratio timer the power ratio timer increments during the steady state of soot sensor regeneration, when the ratio between power demand and power available is Soot sensor transitioned from regeneration to	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) SOT_TotExhSootSnsrVld AND SOT_ExhTempSootSnsrVld AND SOT_ExhPresSootSnsrVld < 5.00 s r <= 1.00	no debouncing time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					measurement status Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Exhaust Sample Error Bank 1 - (EWMA filter used)	P24DA	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	{Heater power filtered using EWMA filter is} OR {Particulate Matter Sensor Exhaust Sample Error Bank 1 previously detected (TRUE -> fault active) AND Heater power filtered using EWMA filter is}	< 15,154,874,324,798,600.00 SOT_SnsrB_ExhGasInChkFA == TRUE < 15,154,874,324,798,600.00	Key is turned on Ignition voltage in range Engine in running mode Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor No fault on exhaust gas pressure estimation at sensor location No fault on exhaust gas temperature estimation at sensor location No fault on gas mass flow estimation at sensor location Diagnostic active only during Soot Sensor protection heating phase OR during Soot Sensor protection heating phase	> 11.00 NOT(SBR_RlyFA) (U02A3) NOT(P24D0) NOT(SOT_ElecFlt) SOT_ExhPresSootSnsrVld SOT_ExhTempSootSnsrVld SOT_TotExhSootSnsrVld 0.00	No debounce time	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and Soot sensor regeneration phase			
					Derivative in volumetric flow	4.00 < d2V < 100.00		
					for a time	> = 0.00 s		
					At InitCntrlr time since engine off	> 28,800.00 s		
					At InitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop	> 22.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off)	> 0.00 s		
					Exhaust gas temperature at Soot Sensor	-20.00 < T < 200.00 °C		
					Environmental pressure	> 70.0 kPa		
					Diagnostic has not yet reported a pass or failure			
					The sign of derivative in volumetric flow does not change for a time	>= 0.00 s		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	O2 signal lower than a minimum value	< -6.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_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.	O2 signal higher than a maximum value	> 29.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_NOx1_O2_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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 1 EIA code not written via DID (DID $60).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 2 EIA code not written via DID (DID $61).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 3 EIA code not written via DID (DID $62).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 4 EIA code not written via DID (DID $63).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 5 EIA code not written via DID (DID $64).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 6 EIA code not written via DID (DID $65).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 7 EIA code not written via DID (DID $66).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 8 EIA code not written via DID (DID $67).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Diesel Intake Air Flow "A" Control Performance	P2957	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor.	|Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled	== TRUE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					Test enabled by calibration	== 1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>= 0.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -23.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Outside air temperature breakpoint for minimum engine coolant temperature enable	>= 1.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Throttle position setpoint in steady state conditions for minimum time	> -160.00 [%/s] < 160.00 [%/s] for >= 4.00 [s]		
					Throttle position closed loop control active			
					No mechanical stop soft approach in progress			
					No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Turbocharge r VGT A Performance	P2958	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	> 16.00 [%]	Cold Start strategy enabled	== TRUE	420.00 fail counts out of 520.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	== 1.00		
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	VGT_PstnSnsrFA ==FALSE VGT_ActCktFA ==FALSE VGT_PstnCntrlFA ==FALSE		
					VGT position setpoint in steady state conditions for minimum time	> -100.00 [%/s] < 100.00 [%/s] for >= 5.00 [s]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>= 0.00 [°C]		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	(A - B) in full load condition is out of plausible range	> 5.00 [%] < -5.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode (No After injection release AND Boolean Flag used to enable After injection status is TRUE) No pending or confirmed DTCs DFCO by-pass Strategy NOT active Stable fuel cut-off condition has been	> 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**) 0 [boolean] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowNotValid	Time counter: (140 +1) 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.
					reached i.e. following conditions are met for a calibrateable time: a. Engine speed in operating range b. EGR mass flow c. Injected fuel quantity in operating range d. Air mass per cylinder in operating range Estimated O2 concentration stable i.e. difference between initial and actual value Air mass flown since fuel cut-off condition	> 1.00 [s] > 1,100 [rpm] < 2,000 [rpm] < 1,000.00 [mg] > 20.00 [mm^3] < 50.00 [mm^3] > 400.00 [mg] < 1,800.00 [mg] < 1.00 [%] > 30,000,001,192,092,900.00 [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.	(A - B) in full load condition is out of plausible range	> 5.00 [%] < -5.00 [%]	Engine running		Time counter: (140 +1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_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 enabled	> 30,000,001,192,092,900.00 [g]		
					Air mass flown since P2A00 disabled	> 10.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Motor Overtemperature (ECB DC Motor)	P2AA5	This monitor checks if the temperature of the HP EGR cooler bypass DC-Motor increases too much (e.g. HP EGR cooler bypass DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

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

Particulate Matter Sensor Processor Performance	P2AB0	This diagnosis detects internal errors to the current switcher (SCU internal error).	NOT
			{
			Soot Sensor Electrode current read in small range
			>=
			Minimum current value in small range
			
			AND
			
			Soot Sensor Electrode current read in small range
			<=
			Maximum current value in small range
			}
					Soot sensor is in regeneration phase
					
					Soot Sensor bus relay is commanded on
					
					No electrical fault active on Soot Sensor bus relay
					
					No faults of CAN communication loss with Soot Sensor
					
					No Electrical faults present on Soot Sensor
					
					Transmission fault with sensor control unit not present
					
					Soot Sensor Electrode current measurement enabled
					
					Soot Sensor Electrode current read in large range
						
						NOT(SBR_RlyFA)
						
						NOT (SOT_SootSnsr_SrlLcFA)
						
						NOT(SOT_ElecIFlt)
						
						NOT (SOT_SootSnsr_SrlFsFA)
						
						{<=
						400.00
						
						AND
						
						<=
						1,399,999,976,158,140.0 0
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 3	U01D2	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Module1 or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 > 100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCrankIgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 1	U061F	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Module1 or Module2, it detende at which module the EGT1 sensore is connected.	Message Faults OR Message Age	>0 > 100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCrankIgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 2	U0620	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Module1 or Module2, it detende at which module the EGT2 sensore is connected.	Message Faults OR Message Age	>0 > 100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCrankIgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Diesel Intake Air Flow "A" Position Sensor	U0654	This monitor checks if the Throttle position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO message fault on Throttle SENT position == TRUE OR	> 625.00 [ms] AND == STEADY LOW > 625.00 [ms] AND == STEADY HIGH message error==TRUE OR	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	== 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(number of Throttle SENT position counters has been updated AND HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE)))	 ------------- AND > 625.00 [ms]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 4	U069A	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Module1 or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 > 100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCrankIgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 5	U069B	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Module1 or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 > 100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCrankIgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Initial Supporting table - EnginePointEnableDPFTempDeviation

Description:

y/x	950	1,000	1,200	1,400	1,600	2,400	3,600	5,000
0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1	1
12	0	0	0	0	1	1	1	1
14	0	0	1	1	1	1	1	1
16	0	1	1	1	1	1	1	1
18	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
60	0	1	1	1	1	1	1	1

Initial Supporting table - Inrush current profile

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

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

Initial Supporting table - Inrush current profile

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

Initial Supporting table - KaFADC_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	45	45	45	45	45	45	45	45	45	45	45	45	45

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	509,765,625	41,015,625	30,078,125	4	4	4	4	4	4	4	4	4

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_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

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

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

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

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

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

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x				
1				

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Overrun condition is enabled

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x				
1				

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x				
1				

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x				
1				

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	118,984,375	12,703,125	123,984,375	15,296,875	18,203,125	20,703,125	228,984,375	28	30,296,875	325
700	118,984,375	12,703,125	141,015,625	158,984,375	18,203,125	20,703,125	228,984,375	28	30,296,875	325
950	118,984,375	12,703,125	16,296,875	178,984,375	19,296,875	20,703,125	228,984,375	28	30,296,875	325
1,200	118,984,375	12,703,125	168,984,375	20	215	231,015,625	24,203,125	288,984,375	30,296,875	325
1,450	118,984,375	12,703,125	168,984,375	20	22,796,875	25,203,125	263,984,375	30,703,125	32	33,796,875
1,700	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	326,015,625	341,015,625	353,984,375
1,950	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	36,203,125	37,796,875
2,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
2,800	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
3,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	70	85	120	130	120	120	110	80

Initial Supporting table - KtGLOD_U_VoltLoDelMax(KnGLOD_I_GP_Curr)

Description: Maximum delta voltage table data for low rationality error check.

y/x	0	4	8	12	16	20	24	28
1	5	5	5	5	5	5	5	5

Initial Supporting table - NOX_NOx2SelfTstEnblCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor selt-test monitoring

NOX_NOx2SelfTstEnblCmbMode - Part 1

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

NOX_NOx2SelfTstEnblCmbMode - Part 2

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

NOX_NOx2SelfTstEnblCmbMode - Part 3

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

NOX_NOx2SelfTstEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

N0X.S1 JDfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Closelnjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_Warmllp	CeCMBR_e_Farlnjection
1	1	1	1	1

N0X.S1 JDfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_eJD PF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	0	1	1

N0X.S1 JDfstMntrEnblCmbMode - Part 3

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

NOX_S1_OfstMntrEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S1_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor OOR high monitor

NOX_S1_OutRngMaxCmbMode - Part 1

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

NOX_S1_OutRngMaxCmbMode - Part 2

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

NOX_S1_OutRngMaxCmbMode - Part 3

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

NOX_S1_OutRngMaxCmbMode - Part 4

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

Initial Supporting table - NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor OOR low monitor

NOX_S1_OutRngMinCmbMode - Part 1

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

NOX_S1_OutRngMinCmbMode - Part 2

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

NOX_S1_OutRngMinCmbMode - Part 3

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

NOX_S1_OutRngMinCmbMode - Part 4

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

Initial Supporting table - NOX_S1_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1

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

NOX_S1_PlausChkEnblCmbMode - Part 2

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

NOX_S1_PlausChkEnblCmbMode - Part 3

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

NOX_S1_PlausChkEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S1_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor stability monitor

NOX_S1_StBitChkEnblCmbMode - Part 1

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

NOX_S1_StBitChkEnblCmbMode - Part 2

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

NOX_S1_StBitChkEnblCmbMode - Part 3

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

NOX_S1_StBitChkEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

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

NOX_S2_OfstMntrEnblCmbMode - Part 2

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

NOX_S2_OfstMntrEnblCmbMode - Part 3

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

NOX_S2_OfstMntrEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OCR high monitor

NOX_S2_OutRngMaxCmbMode - Part 1

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

NOX_S2_OutRngMaxCmbMode - Part 2

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

NOX_S2_OutRngMaxCmbMode - Part 3

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

NOX_S2_OutRngMaxCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OOR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

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

NOX_S2_OutRngMinCmbMode - Part 2

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

NOX_S2_OutRngMinCmbMode - Part 3

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

NOX_S2_OutRngMinCmbMode - Part 4

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

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1

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

NOX_S2_StBitChkEnblCmbMode - Part 2

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

NOX_S2_StBitChkEnblCmbMode - Part 3

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

NOX_S2_StBitChkEnblCmbMode - Part 4

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

Initial Supporting table - P0106, P2227, P227B, P00C7: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured airflow.

Value Units: kPa
X Unit: g/s

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

Initial Supporting table - P0106, P2227, P227B, P1199: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured airflow.

Value Units: kPa
X Unit: g/s

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

Initial Supporting table - SCR_Eff1_CombMode_Enbl

Description:

SCR_Eff1_CombMode_Enbl - Part 1

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

SCR_Eff1_CombMode_Enbl - Part 2

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

SCR_Eff1_CombMode_Enbl - Part 3

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

SCR_Eff1_CombMode_Enbl - Part 4

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

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for C2

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	50	50	50	50	40	20	20	20	20	20	20	20	20

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

Description: Fuel threshold above which the pressure closed loop control is enabled in D1 and D3 modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	48	48	48	48	48	48	48	48	48	48	48	48	70

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in D4 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	48	48	48	48	48	48	48	48	48	48	48	48	70

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	80	50	40	20	20	20	20	20	20	20	20

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

Description: Fuel threshold above which the pressure closed loop control is enabled in V3 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	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	40	25	20	20	20	14	14	14	14	14	14

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in V1 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	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 V2 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

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

Initial Supporting table - 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)

Down Stream Stk Temp Vrtn - Part 1

y/x	-40	0	20	40
1	2	4	5	5

Down Stream Stk Temp Vrtn - Part 2

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

Initial Supporting table - DPFtoRichConversion

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

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

Initial Supporting table - KaFADC_Cnt_SQP_PulsPerStrk

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

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

Initial Supporting table - KaFADC_n_SQP_HiThrsh

Description: High Engine speed threshold to enable SQP learning. This label is function of SQP rail pressure level.

y/x	CeFADR_e_SQA_LrnPres0	CeFADR_e_SQA_LrnPres1	CeFADR_e_SQA_LrnPres2	CeFADR_e_SQA_LrnPres3	CeFADR_e_SQA_LrnPres4	CeFADR_e_SQA_LrnPres5
1	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - KaFADC_n_SQP_HiThrshDelt

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

KaFADC_n_SQP_HiThrshDelt - Part 1

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

KaFADC_n_SQP_HiThrshDelt - Part 2

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

KaFADC_n_SQP_HiThrshDelt - Part 3

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

KaFADC_n_SQP_HiThrshDelt - Part 4

y/x	CeTGRR_e_TransGr8			
1	100			

Initial Supporting table - KaFADC_n_SQP_HysThrsh

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

KaFADC_n_SQP_HysThrsh - Part 1

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

KaFADC_n_SQP_HysThrsh - Part 2

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

KaFADC_n_SQP_HysThrsh - Part 3

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

KaFADC_n_SQP_HysThrsh - Part 4

y/x	CeTGRR_e_TransGr8			
1	50			

Initial Supporting table - KaFADC_n_SQP_HysThrsh

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

KaFADC_n_SQP_HysThrsh - Part 1

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

KaFADC_n_SQP_HysThrsh - Part 2

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

KaFADC_n_SQP_HysThrsh - Part 3

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

KaFADC_n_SQP_HysThrsh - Part 4

y/x	CeTGRR_e_TransGr8			
1	50			

Initial Supporting table - KaFADC_n_SQP_LoThrsh

Description: Low Engine speed threshold to enable SQP learning. This label is function of rail pressure level

y/x	CeFADR_e_SQA_LrnPres0	CeFADR_e_SQA_LrnPres1	CeFADR_e_SQA_LrnPres2	CeFADR_e_SQA_LrnPres3	CeFADR_e_SQA_LrnPres4	CeFADR_e_SQA_LrnPres5
1	900	900	900	900	900	900

Initial Supporting table - KaFADC_p_SQP_DeltPresSetPoint

Description: Delta Pressure from SQP setpoint (KaFADR_p_SQA_LrnSetPointCal) to requested higher pressure in case of zero flow request enabled via calibration (KeFADC_b_SQP_ZeroFlowReqEnbl). In case of zero flow mode disabled this label shall be calibrated to 0. This label is function of SQP rail pressure level.

y/x	0	1	2	3	4	5
1	25	25	25	25	25	25

Initial Supporting table - KaFADC_p_SQP_LrnDeltNeg

Description: Negative Delta pressure from set-point to enabled SQP learning. This label is function of SQP rail pressure level.

y/x	0	1	2	3	4	5
1	1	1	1	15	2	2

Initial Supporting table - KaFADC_p_SQP_LrnDeltPos

Description: Positive Delta pressure from set-point to enabled SQP learning. This label is function of SQP rail pressure level.

y/x	0	1	2	3	4	5
1	25	25	25	25	25	25

Initial Supporting table - KaFADC_t_SQP_MaxAdptDeltET

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

y/x	0	1	2	3	4	5
1	105	81	595	475	47	47

Initial Supporting table - KaFADC_t_SQP_MinAdptDeltET

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

y/x	0	1	2	3	4	5
1	-92	-65	-61	-53	-53	-53

Initial Supporting table - KaFADC_t_SQP_RailPresStdyStDeb

Description: Debouncing time for SQP rail pressure steady-state detection:The first element of the array is used the first time a pressure set-point is request.
The second element is used when rail pressure rebuild is request (in case of zero flow mode enabled) during learning

y/x	0	1
1	1	1

Initial Supporting table - KaFADD_Cnt_SQP_ECM_PulsStpET

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

y/x	0	1	2	3	4	5
1	7	10	7	7	7	7

Initial Supporting table - KaFADD_t_SQP_MaxRailPresTrsh

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

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

Initial Supporting table - KaFADR_b_SQP_CombModeEnbl

Description: Boolean flag array to enable SQP depending on combustion mode active.

KaFADR_b_SQP_CombModeEnbl - Part 1

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

KaFADR_b_SQP_CombModeEnbl - Part 2

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

KaFADR_b_SQP_CombModeEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmlI p	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaFADR_b_SQP_CombModeEnbl - Part 4

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

KaFADR_b_SQP_CombModeEnbl - Part 5

y/x				
1				

Initial Supporting table - KaFADR_b_SQP_GearEnbl

Description: SQP gear index enablement

KaFADR_b_SQP_GearEnbl - Part 1

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

KaFADR_b_SQP_GearEnbl - Part 2

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

KaFADR_b_SQP_GearEnbl - Part 3

y/x	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7
1	0	0	0	1

KaFADR_b_SQP_GearEnbl - Part 4

y/x	CeTGRR_e_TransGr8			
1	1			

Initial Supporting table - KaFADR p SQA LrnSetPointCal

Description: Rail pressure levels used during SQP Learning

y/x	CeFAD R_e_S Q A_LrnPre sO	CeFAD R_e_S Q A_LrnPre s1	CeFAD R_e_S Q A_LrnPre s2	CeFADR_e_SQA_LrnPre s3	CeFADR_e_SQA_LrnPre s4	CeFA D R_e_S Q A_LrnPre s5
1	60	100	140	180	200	215

Initial Supporting table - KaFADR_V_SQA_Test

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

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

Initial Supporting table - NOX_S1_HtrPerfEnblCmbMode

Description:

NOX_S1_HtrPerfEnblCmbMode - Part 1

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

NOX_S1_HtrPerfEnblCmbMode - Part 2

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

NOX_S1_HtrPerfEnblCmbMode - Part 3

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

NOX_S1_HtrPerfEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S2_HtrPerfEnblCmbMode

Description:

NOX_S2_HtrPerfEnblCmbMode - Part 1

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

NOX_S2_HtrPerfEnblCmbMode - Part 2

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

NOX_S2_HtrPerfEnblCmbMode - Part 3

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

NOX_S2_HtrPerfEnblCmbMode - Part 4

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

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

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

Value Units: boolean

y/x	1
1	1

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

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

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	300	300	300	300

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

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

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	136	136	136	136

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

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

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

y/x	100	140	160	180	190	200	210	220	230	240	250	255	260	270	280
1,400	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
1,600	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
1,800	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
2,000	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
2,200	-10	-10	-12	-16	-19	-24	-24	-24	-24	-25	-33	-46	-60	-60	-60
2,400	-13	-13	-17	-23	-27	-29	-31	-31	-32	-36	-41	-46	-51	-51	-51
2,600	-12	-12	-12	-21	-25	-30	-37	-39	-40	-52	-52	-52	-52	-52	-52
2,800	-10	-10	-10	-15	-22	-27	-31	-34	-55	-55	-55	-55	-55	-55	-55
3,000	-16	-16	-16	-16	-25	-31	-35	-40	-46	-46	-46	-46	-46	-46	-46
3,200	-16	-16	-16	-16	-25	-31	-35	-40	-46	-46	-46	-46	-46	-46	-46

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

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

y/x	100	140	160	180	190	200	210	220	230	240	250	255	260	270	280
1,400	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
1,600	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
1,800	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
2,000	-7	-7	-7	-7	-10	-12	-14	-16	-19	-20	-35	-35	-35	-35	-35
2,200	-10	-10	-12	-16	-19	-24	-24	-24	-24	-25	-33	-46	-60	-60	-60
2,400	-13	-13	-17	-23	-27	-29	-31	-31	-32	-36	-41	-46	-51	-51	-51
2,600	-12	-12	-12	-21	-25	-30	-37	-39	-40	-52	-52	-52	-52	-52	-52
2,800	-10	-10	-10	-15	-22	-27	-31	-34	-55	-55	-55	-55	-55	-55	-55
3,000	-16	-16	-16	-16	-25	-31	-35	-40	-46	-46	-46	-46	-46	-46	-46
3,200	-16	-16	-16	-16	-25	-31	-35	-40	-46	-46	-46	-46	-46	-46	-46

Initial Supporting table - P0234: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

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

y/x	100	140	160	180	190	200	210	220	230	240	250	255	260	270	280
70	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375
80	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625
90	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
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	99
1	300	300	300	300

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	99
1	150	150	150	150

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

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

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

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,300	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,400	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,500	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,600	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,700	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,800	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
1,900	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
2,000	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
2,100	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

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

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,300	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,400	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,500	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,600	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,700	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,800	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1,900	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
2,000	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
2,100	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127

Initial Supporting table - P0299: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

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

y/x	100	140	160	180	190	200	210	220	230	240	250	255	260	270	280
70	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375	106,005,859,375
80	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625	10,400,390,625
90	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125	102,001,953,125
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
1	175	1,625	15	1,375	125	1,125	1	1	1	1

Initial Supporting table - P0401: Insufficient HP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,200	1,400	1,600	1,601	1,800
70	135	135	135	135	135	135	135	135
73	135	135	135	135	135	135	135	135
76	135	135	135	135	135	135	135	135
79	135	135	135	135	135	135	135	135
83	135	135	135	135	135	135	135	135
85	135	135	135	135	135	135	135	135
88	135	135	135	135	135	135	135	135
91	135	135	135	135	135	135	135	135
94	135	135	135	135	135	135	135	135
97	135	135	135	135	135	135	135	135
100	135	135	135	135	135	135	135	135

Initial Supporting table - P0401: Insufficient HP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,200	1,400	1,600	1,601	1,800
70	130	20	20	20	20	20	20	20
73	130	20	20	20	20	20	20	20
76	130	20	20	20	20	20	20	20
79	130	20	20	20	20	20	20	20
83	130	20	20	20	20	20	20	20
85	130	20	20	20	20	20	20	20
88	130	20	20	20	20	20	20	20
91	130	20	20	20	20	20	20	20
94	130	20	20	20	20	20	20	20
97	130	20	20	20	20	20	20	20
100	130	20	20	20	20	20	20	20

Initial Supporting table - P0401: Insufficient HP EGRflow monitor enabling

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

Value Units: boolean
X Unit: enum

P0401: Insufficient HP EGR flow monitor enabling - Part 1

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

P0401: Insufficient HP EGR flow monitor enabling - Part 2

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

P0401: Insufficient HP EGR flow monitor enabling - Part 3

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

Initial Supporting table - P0401: Minimum desired HP EGR flow

Description: Minimum desired HP EGR flow above which the insufficient HP EGR flow monitor is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,200	1,400	1,600	1,601	1,800
70	144	144	172	192	192	192	192	192
73	144	144	172	192	192	192	192	192
76	144	144	172	192	192	192	192	192
79	144	144	172	192	192	192	192	192
83	144	144	172	192	192	192	192	192
85	144	144	172	192	192	192	192	192
88	144	144	172	192	192	192	192	192
91	144	144	172	192	192	192	192	192
94	144	144	172	192	192	192	192	192
97	144	144	172	192	192	192	192	192
100	144	144	172	192	192	192	192	192

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

Description: Maximum desired fuel below which the excessive HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,200	1,400	1,600	1,601	1,800
70	135	135	135	135	135	135	135	135
73	135	135	135	135	135	135	135	135
76	135	135	135	135	135	135	135	135
79	135	135	135	135	135	135	135	135
83	135	135	135	135	135	135	135	135
85	135	135	135	135	135	135	135	135
88	135	135	135	135	135	135	135	135
91	135	135	135	135	135	135	135	135
94	135	135	135	135	135	135	135	135
97	135	135	135	135	135	135	135	135
100	135	135	135	135	135	135	135	135

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

Description: Minimum desired fuel above which the excessive HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,200	1,400	1,600	1,601	1,800
70	130	40	40	45	65	95	130	130
73	130	40	40	45	65	95	130	130
76	130	40	40	45	65	95	130	130
79	130	40	40	45	65	95	130	130
83	130	40	40	45	65	95	130	130
85	130	40	40	45	65	95	130	130
88	130	40	40	45	65	95	130	130
91	130	40	40	45	65	95	130	130
94	130	40	40	45	65	95	130	130
97	130	40	40	45	65	95	130	130
100	130	40	40	45	65	95	130	130

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

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

Value Units: boolean
X Unit: enum

P0402: Excessive HP EGR flow monitor enabling - Part 1

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

P0402: Excessive HP EGR flow monitor enabling - Part 2

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

P0402: Excessive HP EGR flow monitor enabling - Part 3

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

Initial Supporting table - P0402: Maximum desired HP EGR flow

Description: Maximum desired HP EGR flow below which the excessive HP EGR flow monitor is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,200	1,400	1,600	1,601	1,800
70	432	432	388	340	336	320	320	320
73	432	432	388	340	336	320	320	320
76	432	432	388	340	336	320	320	320
79	432	432	388	340	336	320	320	320
83	432	432	388	340	336	320	320	320
85	432	432	388	340	336	320	320	320
88	432	432	388	340	336	320	320	320
91	432	432	388	340	336	320	320	320
94	432	432	388	340	336	320	320	320
97	432	432	388	340	336	320	320	320
100	432	432	388	340	336	320	320	320

Initial Supporting table - P140B, P140C: HP EGR slow response enabling

Description: Calibration map for the enabling of HP EGR slow response monitoring, function of combustion mode.

Value Units: boolean

y/x	1
1	1

Initial Supporting table - P140B: Increasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,400	1,800	2,000	2,700	2,701
60	120	120	120	120	120	120	120	120
65	120	120	120	120	120	120	120	120
70	120	120	120	120	120	120	120	120
75	120	120	120	120	120	120	120	120
80	120	120	120	120	120	120	120	120
85	120	120	120	120	120	120	120	120
90	120	120	120	120	120	120	120	120
95	120	120	120	120	120	120	120	120
100	120	120	120	120	120	120	120	120
105	120	120	120	120	120	120	120	120
110	120	120	120	120	120	120	120	120

Initial Supporting table - P140B: Increasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,400	1,800	2,000	2,700	2,701
60	110	20	20	20	20	20	20	110
65	110	20	20	20	20	20	20	110
70	110	20	20	20	20	20	20	110
75	110	20	20	20	20	20	20	110
80	110	20	20	20	20	20	20	110
85	110	20	20	20	20	20	20	110
90	110	20	20	20	20	20	20	110
95	110	20	20	20	20	20	20	110
100	110	20	20	20	20	20	20	110
105	110	20	20	20	20	20	20	110
110	110	20	20	20	20	20	20	110

Initial Supporting table - P140B: Increasing HP EGR slow response threshold

Description: Threshold for increasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	500,030,517,578,125	500,030,517,578,125	500,030,517,578,125

Initial Supporting table - P140C: Decreasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,400	1,800	2,000	2,700	2,701
60	120	120	120	120	120	120	120	120
65	120	120	120	120	120	120	120	120
70	120	120	120	120	120	120	120	120
75	120	120	120	120	120	120	120	120
80	120	120	120	120	120	120	120	120
85	120	120	120	120	120	120	120	120
90	120	120	120	120	120	120	120	120
95	120	120	120	120	120	120	120	120
100	120	120	120	120	120	120	120	120
105	120	120	120	120	120	120	120	120
110	120	120	120	120	120	120	120	120

Initial Supporting table - P140C: Decreasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

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

y/x	799	800	1,000	1,400	1,800	2,000	2,700	2,701
60	110	20	20	20	20	20	20	110
65	110	20	20	20	20	20	20	110
70	110	20	20	20	20	20	20	110
75	110	20	20	20	20	20	20	110
80	110	20	20	20	20	20	20	110
85	110	20	20	20	20	20	20	110
90	110	20	20	20	20	20	20	110
95	110	20	20	20	20	20	20	110
100	110	20	20	20	20	20	20	110
105	110	20	20	20	20	20	20	110
110	110	20	20	20	20	20	20	110

Initial Supporting table - P140C: Decreasing HP EGR slow response threshold

Description: Threshold for decreasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	5,999,755,859,375	5,999,755,859,375	5,999,755,859,375

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	125	2,546,875	384,375	5,140,625	64,375	7,734,375	903,125	10,328,125	11,625	12,921,875	1,421,875	15,515,625	168,125	18,109,375	1,940,625	20,703,125	220
1	300	405	298	246	202	175	157	143	138	128	116	109	102	100	96	93	89

Initial Supporting table - P16F3_EIA safety ck 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	125	2,546,875	384,375	5,140,625	64,375	7,734,375	903,125	10,328,125	11,625	12,921,875	1,421,875	15,515,625	168,125	18,109,375	1,940,625	20,703,125	220
1	300	405	298	246	202	175	157	143	138	128	116	109	102	100	96	93	89

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

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

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

y/x	125	2,546,875	384,375	5,140,625	64,375	7,734,375
1	300	405	298	246	202	175

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

y/x	903,125	10,328,125	11,625	12,921,875	1,421,875	15,515,625
1	157	143	138	128	116	109

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

y/x	168,125	18,109,375	1,940,625	20,703,125	220	
1	102	100	96	93	89	

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

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

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

y/x	20	30	40	50	60	70
1	300	405	298	246	202	175

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

y/x	80	90	100	110	120	130
1	157	143	138	128	116	109

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

y/x	140	150	160	170	180	
1	102	100	96	93	89	

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	132,658,203,125	132,658,203,125	131,418,359,375	130,526,708,984,375	128,697,900,390,625	128,075,146,484,375
550	132,658,203,125	132,658,203,125	131,418,359,375	130,526,708,984,375	128,697,900,390,625	128,075,146,484,375
600	12,822,320,556,640,600	12,822,320,556,640,600	12,698,336,181,640,600	12,609,171,142,578,100	12,426,290,283,203,100	12,364,014,892,578,100
660	1,228,155,517,578,130	1,228,155,517,578,130	1,215,464,111,328,130	1,206,254,638,671,880	1,186,505,615,234,380	1,179,108,154,296,880
720	1,193,531,982,421,880	1,193,531,982,421,880	1,181,133,544,921,880	11,722,171,630,859,400	1,153,928,955,078,130	1,147,701,416,015,630
750	11,597,484,130,859,400	11,597,484,130,859,400	11,475,902,099,609,400	1,138,913,818,359,380	11,218,292,236,328,100	11,165,635,986,328,100
800	112,596,484,375	112,596,484,375	1,114,046,875	1,105,610,595,703,130	10,897,294,921,875	108,542,578,125
850	1,105,857,421,875	1,105,857,421,875	109,412,890,625	10,858,802,490,234,400	1,070,942,138,671,880	1,067,391,357,421,880
900	108,575	108,575	10,742,109,375	106,614,990,234,375	105,215,478,515,625	104,935,693,359,375
1,000	103,841,015,625	103,841,015,625	102,714,453,125	10,193,569,946,289,100	10,067,265,625	10,050,205,078,125
1,100	1,045,640,625	1,045,640,625	103,493,359,375	1,027,262,451,171,880	101,521,484,375	10,139,755,859,375
1,800	8,208,245,239,257,810	8,208,245,239,257,810	8,208,245,239,257,810	8,208,245,239,257,810	8,208,245,239,257,810	8,208,245,239,257,810
2,000	5,719,400,024,414,060	5,719,400,024,414,060	5,719,400,024,414,060	5,719,400,024,414,060	5,719,400,024,414,060	5,719,400,024,414,060
2,200	32,305,999,755,859,400	32,305,999,755,859,400	32,305,999,755,859,400	32,305,999,755,859,400	32,305,999,755,859,400	32,305,999,755,859,400
2,400	7,418,000,030,517,580	7,418,000,030,517,580	7,418,000,030,517,580	7,418,000,030,517,580	7,418,000,030,517,580	7,418,000,030,517,580
2,600	-181	-181	-181	-181	-181	-181
4,800	-19,910,000,610,351,600	-19,910,000,610,351,600	-19,910,000,610,351,600	-19,910,000,610,351,600	-19,910,000,610,351,600	-19,910,000,610,351,600

Initial Supporting table - P16F3_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	10	15	30	50	70
500	4,096	4,096	4,096	4,096	4,096	4,096	4,096
800	4,096	4,096	4,096	200	200	200	200
1,000	4,096	4,096	4,096	200	100	50	0
1,500	4,096	4,096	4,096	200	50	-150	-150
2,000	4,096	4,096	4,096	200	50	-150	-250

Initial Supporting table - P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	10	15	30	50	70
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - 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	125	31,359,375	50,234,375	6,909,375	87,953,125	1,068,125	1,256,875	144,546,875	16,340,625	182,265,625	201,140,625	220
1	1,011	514	377	309	261	230	207	188	173	158	146	135

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

Description: Maximum allowable safety deadband on VGA energizing time correction as function of Fuel Rail Pressure.

y/x	125	2,546,875	384,375	5,140,625	64,375	7,734,375	903,125	10,328,125	11,625	12,921,875	1,421,875	15,515,625	168,125	18,109,375	1,940,625	20,703,125	220
1	150	202	149	123	101	88	78	72	69	64	58	55	51	50	48	46	45

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

Description: Minimum allowable safety deadband on VGA energizing time correction as function of Fuel Rail Pressure.

y/x	125	2,546,875	384,375	5,140,625	64,375	7,734,375	903,125	10,328,125	11,625	12,921,875	1,421,875	15,515,625	168,125	18,109,375	1,940,625	20,703,125	220
1	-150	-202	-149	-123	-101	-88	-78	-72	-69	-64	-58	-55	-51	-50	-48	-46	-45

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck diagnostic.

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

UP Stream Stk Temp Vrtn - Part 1

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

UP Stream Stk Temp Vrtn - Part 2

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

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

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

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

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

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

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

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

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

Initial Supporting table - 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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	419,921,875.00	490,234,375.00	490,234,375.00	580,078,125.00	60,009,765,625.00	5,400,390,625.00	58,984,375.00	41,015,625.00	509,765,625.00	47,021,484,375.00	3,798,828,125.00	47,998,046,875.00	669,921,875.00	52,978,515,625.00	5.00	39,013,671,875.00	52,001,953,125.00
79,986,572,265,625	43,994,140,625.00	47,998,046,875.00	60,009,765,625.00	7,099,609,375.00	68,994,140,625.00	68,017,578,125.00	6,298,828,125.00	60,986,328,125.00	77,978,515,625.00	7,998,046,875.00	64,990,234,375.00	830,078,125.00	9,599,609,375.00	669,921,875.00	64,990,234,375.00	47,021,484,375.00	60,986,328,125.00
1,199,951,171,875	39,990,234,375.00	43,017,578,125.00	52,001,953,125.00	58,984,375.00	7,001,953,125.00	68,017,578,125.00	64,990,234,375.00	64,013,671,875.00	1,169,921,875.00	91,015,625.00	1.00	108,984,375.00	106,982,421,875.00	1.00	1.00	56,005,859,375.00	7,001,953,125.00
17,999,267,578,125	3,798,828,125.00	39,013,671,875.00	5.00	47,998,046,875.00	68,994,140,625.00	68,017,578,125.00	58,984,375.00	66,015,625.00	9,599,609,375.00	7,998,046,875.00	10,498,046,875.00	10,498,046,875.00	106,005,859,375.00	12,099,609,375.00	11,298,828,125.00	77,001,953,125.00	85,986,328,125.00
220,001,220,703,125	35,009,765,625.00	3,798,828,125.00	47,021,484,375.00	43,994,140,625.00	64,990,234,375.00	68,017,578,125.00	5,498,046,875.00	60,009,765,625.00	83,984,375.00	68,994,140,625.00	1,009,765,625.00	97,998,046,875.00	1.00	122,021,484,375.00	114,013,671,875.00	81,982,421,875.00	8,798,828,125.00
239,990,234,375	35,009,765,625.00	3,798,828,125.00	47,021,484,375.00	419,921,875.00	64,013,671,875.00	66,015,625.00	5,400,390,625.00	60,009,765,625.00	7,900,390,625.00	66,015,625.00	1.00	9,501,953,125.00	9,599,609,375.00	1,240,234,375.00	11,298,828,125.00	830,078,125.00	830,078,125.00
29,998,779,296,875	330,078,125.00	3,701,171,875.00	4,501,953,125.00	39,990,234,375.00	60,986,328,125.00	64,013,671,875.00	52,978,515,625.00	580,078,125.00	740,234,375.00	580,078,125.00	919,921,875.00	89,990,234,375.00	919,921,875.00	122,021,484,375.00	114,013,671,875.00	8,798,828,125.00	77,001,953,125.00
600,006,103,515,625	2,900,390,625.00	35,009,765,625.00	419,921,875.00	35,009,765,625.00	56,982,421,875.00	6,298,828,125.00	490,234,375.00	56,982,421,875.00	6,298,828,125.00	43,994,140,625.00	64,990,234,375.00	75.00	81,982,421,875.00	114,013,671,875.00	106,982,421,875.00	1,080,078,125.00	68,994,140,625.00
975,006,103,515,625	27,978,515,625.00	33,984,375.00	41,015,625.00	33,984,375.00	5,498,046,875.00	64,990,234,375.00	47,021,484,375.00	56,005,859,375.00	58,984,375.00	39,013,671,875.00	56,982,421,875.00	669,921,875.00	7,900,390,625.00	110,986,328,125.00	10,400,390,625.00	1,240,234,375.00	669,921,875.00

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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	-106,982,421,875.00	-64,990,234,375.00	-81,982,421,875.00	-7,998,046,875.00	-77,978,515,625.00	-7,099,609,375.00	-669,921,875.00	-66,015,625.00	-6,201,171,875.00	-52,978,515,625.00	-39,013,671,875.00	-52,978,515,625.00	-4,599,609,375.00	-3,701,171,875.00	-31,005,859,375.00	-35,986,328,125.00	-419,921,875.00
79,986,572,265,625	-12,099,609,375.00	-990,234,375.00	-919,921,875.00	-97,021,484,375.00	-81,982,421,875.00	-85,986,328,125.00	-759,765,625.00	-81,982,421,875.00	-740,234,375.00	-740,234,375.00	-43,017,578,125.00	-58,984,375.00	-52,978,515,625.00	-4,501,953,125.00	-419,921,875.00	-4,501,953,125.00	-47,021,484,375.00
1,199,951,171,875	-135,009,765,625.00	-93,017,578,125.00	-81,005,859,375.00	-89,013,671,875.00	-669,921,875.00	-66,015,625.00	-81,005,859,375.00	-72,021,484,375.00	-7,099,609,375.00	-759,765,625.00	-60,986,328,125.00	-72,021,484,375.00	-490,234,375.00	-4,501,953,125.00	-43,994,140,625.00	-419,921,875.00	-3,798,828,125.00
17,999,267,578,125	-139,990,234,375.00	-9,501,953,125.00	-7,099,609,375.00	-7,998,046,875.00	-66,015,625.00	-64,990,234,375.00	-93,994,140,625.00	-85,009,765,625.00	-740,234,375.00	-759,765,625.00	-7,900,390,625.00	-81,982,421,875.00	-7,001,953,125.00	-4,501,953,125.00	-5.00	-52,001,953,125.00	-580,078,125.00
220,001,220,703,125	-139,990,234,375.00	-9,599,609,375.00	-68,017,578,125.00	-77,001,953,125.00	-64,990,234,375.00	-66,015,625.00	-97,021,484,375.00	-8,701,171,875.00	-72,998,046,875.00	-66,015,625.00	-85,009,765,625.00	-89,990,234,375.00	-85,009,765,625.00	-5,498,046,875.00	-68,017,578,125.00	-68,994,140,625.00	-77,978,515,625.00
239,990,234,375	-13,701,171,875.00	-9,599,609,375.00	-68,017,578,125.00	-75.00	-64,013,671,875.00	-66,015,625.00	-85,009,765,625.00	-93,994,140,625.00	-7,998,046,875.00	-68,017,578,125.00	-85,009,765,625.00	-89,990,234,375.00	-85,986,328,125.00	-58,984,375.00	-7,001,953,125.00	-740,234,375.00	-91,015,625.00
29,998,779,296,875	-139,990,234,375.00	-9,599,609,375.00	-66,015,625.00	-72,998,046,875.00	-6,201,171,875.00	-68,017,578,125.00	-72,998,046,875.00	-9,501,953,125.00	-110,009,765,625.00	-759,765,625.00	-89,990,234,375.00	-97,021,484,375.00	-8,701,171,875.00	-7,099,609,375.00	-83,984,375.00	-919,921,875.00	-1,080,078,125.00
600,006,103,515,625	-135,986,328,125.00	-9,599,609,375.00	-64,013,671,875.00	-68,994,140,625.00	-56,005,859,375.00	-7,099,609,375.00	-7,001,953,125.00	-102,001,953,125.00	-97,998,046,875.00	-77,978,515,625.00	-990,234,375.00	-97,998,046,875.00	-990,234,375.00	-10,400,390,625.00	-10,400,390,625.00	-1,240,234,375.00	-164,013,671,875.00
975,006,103,515,625	-135,986,328,125.00	-9,599,609,375.00	-6,298,828,125.00	-68,017,578,125.00	-5,400,390,625.00	-740,234,375.00	-68,017,578,125.00	-10,400,390,625.00	-11,298,828,125.00	-740,234,375.00	-1,009,765,625.00	-9,599,609,375.00	-10,400,390,625.00	-122,998,046,875.00	-108,984,375.00	-127,978,515,625.00	-202,001,953,125.00

Initial Supporting table - IstFireAfterMisJerkAFM

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

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

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
79,986,572,265,625	1	1	1	1	1	1	1	1	1
1,199,951,171,875	1	1	1	1	1	1	1	1	1
15,997,314,453,125	1	1	1	1	1	1	1	1	1
199,981,689,453,125	1	1	1	1	1	1	1	1	1
239,990,234,375	1	1	1	1	1	1	1	1	1
29,998,779,296,875	1	1	1	1	1	1	1	1	1
399,993,896,484,375	1	1	1	1	1	1	1	1	1
5,999,755,859,375	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - IstFireAftrMisAcelAFM

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

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

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
79,986,572,265,625	1	1	1	1	1	1	1	1	1
1,199,951,171,875	1	1	1	1	1	1	1	1	1
15,997,314,453,125	1	1	1	1	1	1	1	1	1
199,981,689,453,125	1	1	1	1	1	1	1	1	1
239,990,234,375	1	1	1	1	1	1	1	1	1
29,998,779,296,875	1	1	1	1	1	1	1	1	1
399,993,896,484,375	1	1	1	1	1	1	1	1	1
5,999,755,859,375	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - Abnormal Cyl Mode

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

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

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

Initial Supporting table - Abnormal Rev Mode

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

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

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

Initial Supporting table - Abnormal SCD Mode

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

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

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

Initial Supporting table - 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
5,999,755,859,375	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
79,986,572,265,625	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
1,199,951,171,875	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
160,003,662,109,375	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
20,001,220,703,125	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
29,998,779,296,875	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
399,993,896,484,375	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
600,006,103,515,625	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00
975,006,103,515,625	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00	60,009,765,625.00

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
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,986,572,265,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,199,951,171,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
160,003,662,109,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
399,993,896,484,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
5,999,755,859,375	7,900,390,625.00	93,017,578,125.00	1,009,765,625.00	9,501,953,125.00	89,013,671,875.00	89,990,234,375.00	740,234,375.00	77,001,953,125.00	77,001,953,125.00	580,078,125.00	39,990,234,375.00	108,984,375.00	102,978,515,625.00	1,330,078,125.00	172,021,484,375.00	131,005,859,375.00	183,984,375.00
79,986,572,265,625	56,982,421,875.00	68,017,578,125.00	83,984,375.00	81,005,859,375.00	759,765,625.00	77,978,515,625.00	6,298,828,125.00	77,978,515,625.00	7,001,953,125.00	6,298,828,125.00	43,994,140,625.00	122,021,484,375.00	11,201,171,875.00	13,701,171,875.00	181,005,859,375.00	131,005,859,375.00	1,830,078,125.00
1,199,951,171,875	330,078,125.00	39,013,671,875.00	4,599,609,375.00	47,998,046,875.00	4,501,953,125.00	509,765,625.00	509,765,625.00	5,400,390,625.00	4,599,609,375.00	56,982,421,875.00	5,498,046,875.00	102,978,515,625.00	93,017,578,125.00	1,330,078,125.00	20,498,046,875.00	143,994,140,625.00	19,501,953,125.00
160,003,662,109,375	240,234,375.00	27,978,515,625.00	33,984,375.00	330,078,125.00	35,009,765,625.00	35,009,765,625.00	419,921,875.00	56,005,859,375.00	43,994,140,625.00	580,078,125.00	56,982,421,875.00	5,400,390,625.00	7,001,953,125.00	1,080,078,125.00	158,984,375.00	16,201,171,875.00	210,009,765,625.00
20,001,220,703,125	240,234,375.00	27,978,515,625.00	33,984,375.00	31,005,859,375.00	39,990,234,375.00	35,986,328,125.00	3,701,171,875.00	5,400,390,625.00	35,009,765,625.00	509,765,625.00	56,005,859,375.00	330,078,125.00	2,998,046,875.00	669,921,875.00	11,201,171,875.00	158,984,375.00	18,701,171,875.00
29,998,779,296,875	18,994,140,625.00	259,765,625.00	31,005,859,375.00	330,078,125.00	5.00	35,986,328,125.00	31,982,421,875.00	39,013,671,875.00	35,009,765,625.00	43,017,578,125.00	47,021,484,375.00	3,798,828,125.00	419,921,875.00	43,994,140,625.00	66,015,625.00	13,798,828,125.00	12,099,609,375.00
399,993,896,484,375	169,921,875.00	25.00	2,998,046,875.00	33,984,375.00	5,400,390,625.00	3,701,171,875.00	2,998,046,875.00	41,015,625.00	35,986,328,125.00	419,921,875.00	43,017,578,125.00	4,501,953,125.00	43,017,578,125.00	2,998,046,875.00	5.00	127,001,953,125.00	9,501,953,125.00
600,006,103,515,625	14,013,671,875.00	240,234,375.00	2,900,390,625.00	3,798,828,125.00	580,078,125.00	3,798,828,125.00	2,900,390,625.00	41,015,625.00	35,986,328,125.00	39,990,234,375.00	33,984,375.00	47,998,046,875.00	35,986,328,125.00	43,994,140,625.00	47,998,046,875.00	1,169,921,875.00	7,099,609,375.00
975,006,103,515,625	169,921,875.00	2,900,390,625.00	35,009,765,625.00	419,921,875.00	6,201,171,875.00	3,798,828,125.00	2,998,046,875.00	3,798,828,125.00	35,986,328,125.00	3,798,828,125.00	31,005,859,375.00	4,599,609,375.00	31,982,421,875.00	52,001,953,125.00	4,599,609,375.00	110,986,328,125.00	56,005,859,375.00

Initial Supporting table - BankCylModeJerk

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

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

y/x	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
5,999,755,859,375	310,986,328,125.00	3.00	25.00	225.00	29,501,953,125.00	3.00	14,599,609,375.00	13,798,828,125.00	114,990,234,375.00	106,005,859,375.00	152,001,953,125.00	1,759,765,625.00	197,021,484,375.00	208,984,375.00	310,009,765,625.00	17,099,609,375.00	241,015,625.00
79,986,572,265,625	193,017,578,125.00	202,978,515,625.00	202,978,515,625.00	197,021,484,375.00	2.00	268,994,140,625.00	114,990,234,375.00	135,986,328,125.00	102,978,515,625.00	89,990,234,375.00	118,017,578,125.00	152,978,515,625.00	189,990,234,375.00	197,021,484,375.00	327,001,953,125.00	172,998,046,875.00	2,240,234,375.00
1,199,951,171,875	89,013,671,875.00	91,015,625.00	919,921,875.00	102,001,953,125.00	9,501,953,125.00	122,998,046,875.00	93,994,140,625.00	77,001,953,125.00	830,078,125.00	93,017,578,125.00	106,982,421,875.00	127,978,515,625.00	152,001,953,125.00	1,740,234,375.00	2,740,234,375.00	15.00	1,830,078,125.00
160,003,662,109,375	6,298,828,125.00	60,009,765,625.00	6,298,828,125.00	7,099,609,375.00	6,201,171,875.00	68,994,140,625.00	7,900,390,625.00	85,986,328,125.00	114,990,234,375.00	7,001,953,125.00	110,986,328,125.00	116,015,625.00	110,009,765,625.00	139,990,234,375.00	214,013,671,875.00	1,580,078,125.00	189,990,234,375.00
20,001,220,703,125	68,017,578,125.00	66,015,625.00	6,298,828,125.00	6,298,828,125.00	7,001,953,125.00	7,099,609,375.00	97,998,046,875.00	9,501,953,125.00	85,986,328,125.00	740,234,375.00	102,978,515,625.00	9,599,609,375.00	10,498,046,875.00	11,201,171,875.00	147,998,046,875.00	16,298,828,125.00	2.00
29,998,779,296,875	60,009,765,625.00	580,078,125.00	56,982,421,875.00	580,078,125.00	759,765,625.00	72,998,046,875.00	77,978,515,625.00	1.00	1,259,765,625.00	759,765,625.00	89,013,671,875.00	830,078,125.00	93,994,140,625.00	102,001,953,125.00	12,998,046,875.00	1,419,921,875.00	19,599,609,375.00
399,993,896,484,375	52,978,515,625.00	5,498,046,875.00	5,498,046,875.00	58,984,375.00	75.00	72,998,046,875.00	7,900,390,625.00	93,017,578,125.00	93,017,578,125.00	89,990,234,375.00	85,009,765,625.00	72,998,046,875.00	85,009,765,625.00	106,982,421,875.00	89,013,671,875.00	141,015,625.00	193,017,578,125.00
600,006,103,515,625	47,021,484,375.00	509,765,625.00	5,400,390,625.00	56,982,421,875.00	75.00	7,099,609,375.00	77,978,515,625.00	9,599,609,375.00	9,599,609,375.00	72,021,484,375.00	81,982,421,875.00	64,990,234,375.00	77,978,515,625.00	127,001,953,125.00	60,986,328,125.00	114,990,234,375.00	181,982,421,875.00
975,006,103,515,625	490,234,375.00	52,001,953,125.00	5,400,390,625.00	5,498,046,875.00	740,234,375.00	7,001,953,125.00	77,001,953,125.00	9,599,609,375.00	91,015,625.00	68,017,578,125.00	81,982,421,875.00	58,984,375.00	72,021,484,375.00	1,330,078,125.00	47,021,484,375.00	9,599,609,375.00	177,978,515,625.00

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

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

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

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
10	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
20	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
30	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
40	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
50	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
60	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
70	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
80	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
90	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0
100	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0	5,119,921,875.0

Initial Supporting table - CatCrtdMaxFuel

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

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000

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
4,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
199,981,689,453,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
399,993,896,484,375	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
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,998,779,296,875	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 - ЄlyBeforeAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different patterni 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
4,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
199,981,689,453,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
399,993,896,484,375	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
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,998,779,296,875	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 different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1

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

CombustModeIdleTbl - Part 2

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

CombustModeIdleTbl - Part 3

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

Initial Supporting table - ConsecCylModDecel

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

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

y/x	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	110,009,765,625.00	11,201,171,875.00	1,080,078,125.00	990,234,375.00	12,998,046,875.00	1,259,765,625.00	122,998,046,875.00	116,015,625.00	56,982,421,875.00	60,009,765,625.00	83,984,375.00	919,921,875.00	147,998,046,875.00	131,982,421,875.00	1,759,765,625.00	13,701,171,875.00	193,017,578,125.00
5,999,755,859,375	110,986,328,125.00	102,001,953,125.00	122,998,046,875.00	93,994,140,625.00	102,001,953,125.00	11,298,828,125.00	12,900,390,625.00	118,994,140,625.00	5,400,390,625.00	85,009,765,625.00	89,990,234,375.00	97,998,046,875.00	14,501,953,125.00	1,330,078,125.00	16,201,171,875.00	1,259,765,625.00	183,984,375.00
100,006,103,515,625	97,021,484,375.00	1,080,078,125.00	131,005,859,375.00	93,994,140,625.00	93,017,578,125.00	1,009,765,625.00	116,015,625.00	12,099,609,375.00	12,998,046,875.00	131,982,421,875.00	1,169,921,875.00	118,017,578,125.00	127,001,953,125.00	1,240,234,375.00	110,009,765,625.00	11,298,828,125.00	1,669,921,875.00
1,400,146,484,375	116,015,625.00	122,021,484,375.00	14,599,609,375.00	122,998,046,875.00	131,982,421,875.00	125.00	1.00	118,017,578,125.00	158,984,375.00	139,990,234,375.00	1,240,234,375.00	127,978,515,625.00	102,978,515,625.00	1.00	1.00	114,990,234,375.00	125.00
17,999,267,578,125	118,017,578,125.00	131,982,421,875.00	158,984,375.00	14,501,953,125.00	1,669,921,875.00	1,509,765,625.00	77,978,515,625.00	1.00	122,021,484,375.00	12,900,390,625.00	118,994,140,625.00	116,015,625.00	89,013,671,875.00	1.00	93,994,140,625.00	122,998,046,875.00	114,013,671,875.00
220,001,220,703,125	116,015,625.00	13,798,828,125.00	164,990,234,375.00	152,001,953,125.00	189,990,234,375.00	172,021,484,375.00	740,234,375.00	77,978,515,625.00	9,599,609,375.00	110,009,765,625.00	110,009,765,625.00	108,984,375.00	81,982,421,875.00	91,015,625.00	93,994,140,625.00	131,982,421,875.00	12,001,953,125.00
29,998,779,296,875	106,982,421,875.00	147,021,484,375.00	172,021,484,375.00	17,900,390,625.00	214,990,234,375.00	185,986,328,125.00	83,984,375.00	64,013,671,875.00	89,990,234,375.00	77,001,953,125.00	93,017,578,125.00	740,234,375.00	77,978,515,625.00	58,984,375.00	60,009,765,625.00	147,021,484,375.00	12,099,609,375.00
600,006,103,515,625	1,009,765,625.00	160,986,328,125.00	18,701,171,875.00	2,169,921,875.00	256,005,859,375.00	218,994,140,625.00	81,005,859,375.00	56,005,859,375.00	85,009,765,625.00	669,921,875.00	6,201,171,875.00	6,201,171,875.00	7,001,953,125.00	669,921,875.00	17,001,953,125.00	247,998,046,875.00	1,259,765,625.00
975,006,103,515,625	97,998,046,875.00	16,201,171,875.00	193,994,140,625.00	233,984,375.00	2,740,234,375.00	233,984,375.00	81,005,859,375.00	509,765,625.00	83,984,375.00	64,990,234,375.00	52,001,953,125.00	77,978,515,625.00	66,015,625.00	6,298,828,125.00	256,982,421,875.00	306,982,421,875.00	1,330,078,125.00

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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	-52,001,953,125	-68,994,140,625	-7,900,390,625	-110,009,765,625	-158,984,375	-147,021,484,375	-97,998,046,875	-127,001,953,125	-135,009,765,625	-72,998,046,875	-9,501,953,125	-9,501,953,125	-68,994,140,625	-68,017,578,125	-60,009,765,625	-35,986,328,125	-47,021,484,375
5,999,755,859,375	-47,998,046,875	-7,001,953,125	-72,021,484,375	-10,400,390,625	-156,982,421,875	-147,998,046,875	-164,990,234,375	-20,400,390,625	-17,099,609,375	-93,994,140,625	-1,419,921,875	-127,001,953,125	-83,984,375	-830,078,125	-72,998,046,875	-419,921,875	-52,978,515,625
100,006,103,515,625	-2,099,609,375	-31,005,859,375	-39,013,671,875	-56,982,421,875	-77,978,515,625	-83,984,375	-197,998,046,875	-30,400,390,625	-266,015,625	-131,005,859,375	-14,599,609,375	-15,498,046,875	-106,005,859,375	-110,009,765,625	-12,099,609,375	-4,501,953,125	-52,978,515,625
1,400,146,484,375	-1,201,171,875	-18,017,578,125	-2,099,609,375	-31,005,859,375	-33,984,375	-35,009,765,625	-202,001,953,125	-2,669,921,875	-360,009,765,625	-131,982,421,875	-143,017,578,125	-1,490,234,375	-1	-12,998,046,875	-131,982,421,875	-43,017,578,125	-47,021,484,375
17,999,267,578,125	-400,390,625	-80,078,125	-8,984,375	-14,990,234,375	-1,201,171,875	-10,009,765,625	-21,201,171,875	-277,978,515,625	-347,998,046,875	-1,259,765,625	-122,998,046,875	-125	-102,978,515,625	-139,013,671,875	-147,021,484,375	-52,001,953,125	-43,017,578,125
220,001,220,703,125	2,998,046,875	22,021,484,375	18,994,140,625	1,298,828,125	9,765,625	2,001,953,125	-20,400,390,625	-27,001,953,125	-32,900,390,625	-9,501,953,125	-10,400,390,625	-114,990,234,375	-1	-15	-177,001,953,125	-68,994,140,625	-52,001,953,125
29,998,779,296,875	47,021,484,375	33,984,375	2,900,390,625	16,015,625	14,013,671,875	18,017,578,125	-1,509,765,625	-21,201,171,875	-335,009,765,625	-77,001,953,125	-830,078,125	-9,501,953,125	-7,998,046,875	-160,986,328,125	-2	-1,330,078,125	-118,994,140,625
600,006,103,515,625	64,013,671,875	47,021,484,375	39,990,234,375	22,021,484,375	27,978,515,625	3,798,828,125	-759,765,625	-156,005,859,375	-27,001,953,125	-52,978,515,625	-6,298,828,125	-7,001,953,125	-60,986,328,125	-2	-15,400,390,625	-289,013,671,875	-258,984,375
975,006,103,515,625	66,015,625	509,765,625	4,599,609,375	240,234,375	31,982,421,875	4,599,609,375	-47,021,484,375	-139,990,234,375	-272,998,046,875	-4,501,953,125	-5,498,046,875	-580,078,125	-52,978,515,625	-218,017,578,125	-1,419,921,875	-327,001,953,125	-347,998,046,875

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
40,008,544,921,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,400,146,484,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17,999,267,578,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	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
40,008,544,921,875	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,999,755,859,375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100,006,103,515,625	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400,146,484,375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17,999,267,578,125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220,001,220,703,125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29,998,779,296,875	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600,006,103,515,625	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
975,006,103,515,625	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
4,998,779,296,875	0	0	0	0	0	0	0	0	0
999,755,859,375	0	0	0	0	0	0	0	0	0
199,981,689,453,125	0	0	0	0	0	0	0	0	0
29,998,779,296,875	0	0	0	0	0	0	0	0	0
399,993,896,484,375	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
5,999,755,859,375	0	0	0	0	0	0	0	0	0
79,998,779,296,875	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
4,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
199,981,689,453,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
399,993,896,484,375	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
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,998,779,296,875	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 (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

CylModeDecel - Part 1

y/x	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	1,098	8,885	6,995	597	371	2,375	1,995	178	150	1,045	84	65	46
2,001,953,125	8,005	6,055	456	475	328	214	1,675	1,565	1,195	85	645	555	425
3,997,802,734,375	672	5,435	441	403	2,805	184	1,485	1,315	795	68	515	445	375
5,999,755,859,375	6,635	5,375	396	335	2,375	1,805	1,385	110	735	56	435	355	315
8,001,708,984,375	890	6,705	4,865	365	247	189	1,355	1,005	765	505	395	28	275
999,755,859,375	1,041	8,025	575	4,425	286	2,145	156	1,025	82	535	355	28	24
1,199,951,171,875	1,158	9,005	661	5,175	3,425	238	175	105	91	57	355	29	235
1,400,146,484,375	1,270	1,009	746	5,735	395	257	197	1,085	1,035	61	41	315	25
15,997,314,453,125	1,389	1,127	828	630	4,525	285	217	1,375	117	655	52	345	27
17,999,267,578,125	1,579	12,225	9,125	6,925	4,995	3,115	2,365	165	128	76	59	40	285
20,001,220,703,125	1,803	13,015	994	7,465	552	3,395	256	193	144	905	695	46	31
219,970,703,125	19,755	14,065	1,071	818	6,055	3,675	278	2,215	159	102	795	52	335
239,990,234,375	2,117	1,493	1,143	885	6,565	3,965	306	247	174	113	90	58	36
29,998,779,296,875	2,609	18,175	1,363	10,775	795	4,795	381	3,165	214	145	119	745	455
4,000,244,140,625	34,445	23,365	17,195	13,895	10,285	617	497	4,395	284	205	175	104	65
5,999,755,859,375	49,515	3,384	24,645	2,008	1,487	8,925	7,235	6,755	416	297	2,735	165	107
9,749,755,859,375	7,796	5,301	3,867	3,145	2,337	1,408	11,595	11,285	670	4,735	458	2,775	1,835

Initial Supporting table - CylModeDecel

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
50,048,828,125	355	235	215	255	22	17	327,655	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	315	19	195	205	205	15	327,655	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	265	165	17	17	19	135	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	22	145	15	145	175	125	327,655	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	18	13	135	13	16	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	165	13	125	11	15	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	17	14	12	10	135	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	18	15	125	10	13	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	20	165	13	11	13	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	22	18	14	12	13	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	24	20	15	13	135	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	265	22	16	14	14	125	327,655	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	29	24	17	15	15	145	327,655	327,675	327,675	327,675	327,675	327,675	327,675
29,998,779,296,875	36	295	205	175	17	195	327,655	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	48	395	265	23	205	275	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	755	585	39	345	26	43	327,655	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	1,285	935	61	56	36	72	327,655	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - CylModeJerk

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

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

CylModeJerk - Part 1

y/x	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	9,085	7,115	564	498	332	224	181	161	138	134	54	66	285
2,001,953,125	693	583	469	426	2,645	1,825	1,415	128	1,165	94	435	505	25
3,997,802,734,375	5,425	4,795	369	3,175	2,185	149	1,235	885	89	59	355	385	205
5,999,755,859,375	4,805	360	313	3,065	202	136	108	835	70	505	34	32	165
8,001,708,984,375	672	548	4,155	3,445	2,125	1,585	107	87	80	46	33	285	19
999,755,859,375	8,265	662	528	450	272	220	144	93	87	49	37	275	205
1,199,951,171,875	930	766	645	5,795	369	2,765	1,865	1,055	94	595	395	27	22
1,400,146,484,375	1,072	9,355	7,805	698	463	3,355	231	1,125	104	675	40	33	235
15,997,314,453,125	1,171	1,022	8,915	814	5,525	393	273	126	1,195	62	445	40	27
17,999,267,578,125	1,303	1,149	10,115	9,325	6,455	450	3,145	156	126	765	55	405	31
20,001,220,703,125	1,467	1,280	11,285	1,045	750	4,935	3,515	1,815	122	825	66	535	35
219,970,703,125	1,572	1,409	12,415	11,595	8,545	5,595	3,885	209	152	89	735	61	395
239,990,234,375	1,713	1,526	1,350	12,695	959	6,295	4,255	2,365	189	97	835	695	445
29,998,779,296,875	2,105	19,615	17,015	15,905	1,280	8,215	528	306	277	135	815	92	575
4,000,244,140,625	2,720	24,535	2,233	2,114	17,575	1,159	699	406	3,835	200	163	116	785
5,999,755,859,375	40,805	38,425	3,379	31,515	27,805	18,085	10,255	6,335	6,075	290	240	2,135	118
9,749,755,859,375	6,573	60,095	5,449	5,101	4,669	30,345	1,615	10,865	1,025	4,755	4,025	3,785	1,925

Initial Supporting table - CylModeJerk

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
50,048,828,125	285	26	275	23	185	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	22	215	23	205	16	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	19	175	205	175	14	95	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	165	16	175	15	12	85	327,655	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	17	15	165	13	11	85	327,655	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	165	155	155	12	11	85	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	18	165	155	125	11	9	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	195	185	165	14	115	95	327,655	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	22	205	175	135	12	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	255	20	19	16	125	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	28	22	20	165	135	11	327,655	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	31	23	21	155	145	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	34	255	22	165	155	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
29,998,779,296,875	43	345	255	185	18	13	327,655	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	605	475	305	275	205	15	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	915	715	39	425	31	195	327,655	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	153	118	57	72	50	27	327,655	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - DeacCylInversionDecel

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

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

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
4,998,779,296,875	0	0	0	0	0	0	0	0	0
999,755,859,375	0	0	0	0	0	0	0	0	0
199,981,689,453,125	0	0	0	0	0	0	0	0	0
29,998,779,296,875	0	0	0	0	0	0	0	0	0
399,993,896,484,375	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
5,999,755,859,375	0	0	0	0	0	0	0	0	0
79,998,779,296,875	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 (usee)
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
4,998,779,296,875	0	0	0	0	0	0	0	0	0
999,755,859,375	0	0	0	0	0	0	0	0	0
199,981,689,453,125	0	0	0	0	0	0	0	0	0
29,998,779,296,875	0	0	0	0	0	0	0	0	0
399,993,896,484,375	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
5,999,755,859,375	0	0	0	0	0	0	0	0	0
79,998,779,296,875	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

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

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	5,200	5,200	5,200	5,200	5,200	5,200	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	2,925	5,200	2,925	5,200	5,200	

Initial Supporting table - InfrequentRegen

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

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

InfrequentRegen - Part 1

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

InfrequentRegen - Part 2

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

InfrequentRegen - Part 3

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

Initial Supporting table - Number of Normals

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

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

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

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

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

Value Units: kPa
X Unit: rpm

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

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

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

Value Units: kPa
X Unit: rpm

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

Initial Supporting table - P0101: Pulsation Map

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

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,020	3,200	3,400	3,600
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
130	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0101: VGT position High limit in Overrun

Description: VGT position high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	8,984,375	8,984,375	8,984,375	8,984,375	8,984,375	8,984,375	8,984,375	8,984,375

Initial Supporting table - P0101: VGT position Low limit in Overrun

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

Value Units: %
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	58,984,375	58,984,375	58,984,375	58,984,375	58,984,375	58,984,375	58,984,375	58,984,375

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	125	2,546,875	384,375	5,140,625	64,375	7,734,375	903,125	10,328,125	11,625	12,921,875	1,421,875	15,515,625	168,125	18,109,375	1,940,625	20,703,125	220
1	300	405	298	246	202	175	157	143	138	128	116	109	102	100	96	93	89

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

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

Value Units: g/s
X Unit: deg C

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

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

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

Value Units: g/s
X Unit: deg C

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

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

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

Value Units: s
X Unit: g/s

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

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
40,008,544,921,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,400,146,484,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17,999,267,578,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	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
40,008,544,921,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,400,146,484,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17,999,267,578,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	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, Mulitplierto 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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	102,001,953,125.00	8,798,828,125.00	85,986,328,125.00	10,400,390,625.00	1,009,765,625.00	1,009,765,625.00	10,400,390,625.00	990,234,375.00	12,900,390,625.00	85,009,765,625.00	56,005,859,375.00	118,994,140,625.00	172,998,046,875.00	759,765,625.00	102,978,515,625.00	12,900,390,625.00	141,015,625.00
5,999,755,859,375	10,400,390,625.00	89,990,234,375.00	830,078,125.00	10,400,390,625.00	91,015,625.00	91,015,625.00	93,994,140,625.00	8,798,828,125.00	85,009,765,625.00	85,986,328,125.00	56,005,859,375.00	118,017,578,125.00	16,201,171,875.00	72,998,046,875.00	102,978,515,625.00	1,259,765,625.00	139,990,234,375.00
100,006,103,515,625	85,009,765,625.00	7,900,390,625.00	7,099,609,375.00	102,001,953,125.00	91,015,625.00	1.00	8,798,828,125.00	93,017,578,125.00	64,990,234,375.00	77,001,953,125.00	56,005,859,375.00	85,009,765,625.00	93,017,578,125.00	7,998,046,875.00	9,501,953,125.00	110,009,765,625.00	13,798,828,125.00
1,400,146,484,375	93,017,578,125.00	830,078,125.00	990,234,375.00	108,984,375.00	110,986,328,125.00	106,982,421,875.00	89,990,234,375.00	97,998,046,875.00	1,009,765,625.00	89,013,671,875.00	759,765,625.00	75.00	740,234,375.00	8,798,828,125.00	89,990,234,375.00	8,798,828,125.00	12,001,953,125.00
17,999,267,578,125	1,009,765,625.00	83,984,375.00	10,498,046,875.00	110,986,328,125.00	122,021,484,375.00	11,201,171,875.00	12,998,046,875.00	114,013,671,875.00	93,994,140,625.00	990,234,375.00	108,984,375.00	91,015,625.00	830,078,125.00	93,017,578,125.00	7,900,390,625.00	68,994,140,625.00	89,990,234,375.00
220,001,220,703,125	9,599,609,375.00	85,986,328,125.00	106,982,421,875.00	110,009,765,625.00	127,978,515,625.00	114,990,234,375.00	14,501,953,125.00	141,015,625.00	114,013,671,875.00	1,080,078,125.00	122,021,484,375.00	10,400,390,625.00	91,015,625.00	93,994,140,625.00	81,982,421,875.00	85,986,328,125.00	759,765,625.00
29,998,779,296,875	9,501,953,125.00	91,015,625.00	108,984,375.00	114,013,671,875.00	135,986,328,125.00	11,298,828,125.00	168,994,140,625.00	172,998,046,875.00	1,419,921,875.00	118,994,140,625.00	131,982,421,875.00	118,017,578,125.00	1.00	106,982,421,875.00	1.00	106,005,859,375.00	669,921,875.00
600,006,103,515,625	9,501,953,125.00	97,998,046,875.00	1,169,921,875.00	118,994,140,625.00	15.00	1,169,921,875.00	20,498,046,875.00	22,998,046,875.00	16,201,171,875.00	1,169,921,875.00	122,998,046,875.00	127,001,953,125.00	1,169,921,875.00	118,994,140,625.00	114,013,671,875.00	152,001,953,125.00	7,099,609,375.00
975,006,103,515,625	9,501,953,125.00	106,005,859,375.00	122,021,484,375.00	122,021,484,375.00	156,005,859,375.00	1,169,921,875.00	214,013,671,875.00	24,599,609,375.00	168,017,578,125.00	118,994,140,625.00	118,017,578,125.00	127,978,515,625.00	118,994,140,625.00	125.00	118,994,140,625.00	181,005,859,375.00	7,099,609,375.00

Initial Supporting table - PairCylModeJerk

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

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

y/x	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	110,009,765,625.00	141,015,625.00	990,234,375.00	152,001,953,125.00	172,021,484,375.00	175.00	11,298,828,125.00	1,509,765,625.00	235,009,765,625.00	1,830,078,125.00	21,201,171,875.00	20,498,046,875.00	166,015,625.00	10,498,046,875.00	12,001,953,125.00	214,013,671,875.00	347,021,484,375.00
5,999,755,859,375	114,990,234,375.00	158,984,375.00	83,984,375.00	139,013,671,875.00	14,501,953,125.00	16,298,828,125.00	106,982,421,875.00	14,501,953,125.00	181,005,859,375.00	125.00	172,998,046,875.00	193,994,140,625.00	156,005,859,375.00	106,005,859,375.00	127,001,953,125.00	225.00	3,240,234,375.00
100,006,103,515,625	91,015,625.00	9,599,609,375.00	66,015,625.00	122,021,484,375.00	1.00	1,259,765,625.00	9,599,609,375.00	11,298,828,125.00	1,169,921,875.00	10,400,390,625.00	11,201,171,875.00	108,984,375.00	122,998,046,875.00	93,994,140,625.00	125.00	191,015,625.00	235,009,765,625.00
1,400,146,484,375	97,021,484,375.00	9,501,953,125.00	89,990,234,375.00	106,005,859,375.00	102,978,515,625.00	11,298,828,125.00	12,001,953,125.00	12,099,609,375.00	135,986,328,125.00	1,259,765,625.00	11,298,828,125.00	10,498,046,875.00	93,017,578,125.00	8,798,828,125.00	89,013,671,875.00	143,017,578,125.00	147,021,484,375.00
17,999,267,578,125	102,001,953,125.00	990,234,375.00	9,501,953,125.00	10,400,390,625.00	102,978,515,625.00	1,080,078,125.00	93,994,140,625.00	177,978,515,625.00	139,013,671,875.00	141,015,625.00	114,990,234,375.00	106,005,859,375.00	102,978,515,625.00	8,701,171,875.00	77,978,515,625.00	9,599,609,375.00	9,599,609,375.00
220,001,220,703,125	102,978,515,625.00	1.00	97,021,484,375.00	1,009,765,625.00	102,001,953,125.00	110,986,328,125.00	9,599,609,375.00	20,400,390,625.00	1,419,921,875.00	12,998,046,875.00	1,240,234,375.00	110,986,328,125.00	114,990,234,375.00	93,017,578,125.00	97,021,484,375.00	93,017,578,125.00	990,234,375.00
29,998,779,296,875	10,498,046,875.00	1.00	97,998,046,875.00	9,599,609,375.00	1.00	114,013,671,875.00	93,994,140,625.00	218,994,140,625.00	2.00	1,330,078,125.00	1,330,078,125.00	12,099,609,375.00	110,009,765,625.00	10,400,390,625.00	114,013,671,875.00	122,021,484,375.00	131,005,859,375.00
600,006,103,515,625	108,984,375.00	102,978,515,625.00	102,978,515,625.00	93,994,140,625.00	97,021,484,375.00	118,017,578,125.00	85,009,765,625.00	189,013,671,875.00	172,021,484,375.00	127,001,953,125.00	139,990,234,375.00	127,001,953,125.00	1,259,765,625.00	141,015,625.00	1,009,765,625.00	1,759,765,625.00	2,330,078,125.00
975,006,103,515,625	110,009,765,625.00	106,982,421,875.00	106,005,859,375.00	919,921,875.00	97,021,484,375.00	122,021,484,375.00	81,005,859,375.00	181,005,859,375.00	2,009,765,625.00	12,099,609,375.00	143,017,578,125.00	127,978,515,625.00	127,978,515,625.00	15,400,390,625.00	97,021,484,375.00	189,990,234,375.00	306,005,859,375.00

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
40,008,544,921,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,986,572,265,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,199,951,171,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17,999,267,578,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
239,990,234,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	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
40,008,544,921,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,986,572,265,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,199,951,171,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17,999,267,578,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
239,990,234,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplierto 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
4,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
199,981,689,453,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
399,993,896,484,375	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
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,998,779,296,875	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
4,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
199,981,689,453,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
399,993,896,484,375	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
5,999,755,859,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,998,779,296,875	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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	1,009,765,625.00	1.00	1.00	1.00	102,978,515,625.00	1.00	102,001,953,125.00	1.00	1.00	1.00	1.00	1.00	1.00	12,998,046,875.00	1.00	1.00	10,400,390,625.00
79,986,572,265,625	106,982,421,875.00	110,986,328,125.00	1,240,234,375.00	127,978,515,625.00	108,984,375.00	114,013,671,875.00	118,017,578,125.00	108,984,375.00	1.00	114,013,671,875.00	1.00	1.00	10,400,390,625.00	10,498,046,875.00	1.00	1.00	1.00
1,199,951,171,875	12,900,390,625.00	11,201,171,875.00	122,998,046,875.00	133,984,375.00	135,009,765,625.00	1,330,078,125.00	114,013,671,875.00	110,986,328,125.00	127,978,515,625.00	12,099,609,375.00	114,990,234,375.00	12,099,609,375.00	12,099,609,375.00	12,099,609,375.00	114,990,234,375.00	1.00	10,498,046,875.00
17,999,267,578,125	14,599,609,375.00	127,001,953,125.00	13,701,171,875.00	1,509,765,625.00	168,017,578,125.00	160,009,765,625.00	102,978,515,625.00	102,978,515,625.00	10,400,390,625.00	118,017,578,125.00	127,978,515,625.00	133,984,375.00	135,986,328,125.00	139,013,671,875.00	1,330,078,125.00	118,994,140,625.00	1,240,234,375.00
220,001,220,703,125	141,015,625.00	131,982,421,875.00	139,990,234,375.00	1,580,078,125.00	177,001,953,125.00	1,669,921,875.00	1,009,765,625.00	102,978,515,625.00	1.00	11,298,828,125.00	14,599,609,375.00	14,501,953,125.00	135,986,328,125.00	141,015,625.00	139,013,671,875.00	139,013,671,875.00	1,240,234,375.00
239,990,234,375	14,501,953,125.00	135,009,765,625.00	139,990,234,375.00	160,009,765,625.00	17,900,390,625.00	166,015,625.00	1,009,765,625.00	106,982,421,875.00	1.00	11,201,171,875.00	1,509,765,625.00	143,017,578,125.00	13,798,828,125.00	147,021,484,375.00	139,990,234,375.00	143,017,578,125.00	1,169,921,875.00
29,998,779,296,875	143,017,578,125.00	1,419,921,875.00	139,990,234,375.00	164,990,234,375.00	18,701,171,875.00	168,017,578,125.00	10,400,390,625.00	116,015,625.00	1.00	110,986,328,125.00	152,978,515,625.00	1,509,765,625.00	14,599,609,375.00	160,986,328,125.00	15,400,390,625.00	158,984,375.00	11,298,828,125.00
600,006,103,515,625	14,599,609,375.00	15,498,046,875.00	141,015,625.00	177,001,953,125.00	2,009,765,625.00	1,759,765,625.00	102,001,953,125.00	108,984,375.00	1.00	1,169,921,875.00	131,982,421,875.00	15,400,390,625.00	14,501,953,125.00	1,919,921,875.00	1,669,921,875.00	2,169,921,875.00	102,001,953,125.00
975,006,103,515,625	147,021,484,375.00	158,984,375.00	1,419,921,875.00	181,005,859,375.00	206,982,421,875.00	177,001,953,125.00	1.00	11,201,171,875.00	1.00	116,015,625.00	127,001,953,125.00	1,509,765,625.00	14,501,953,125.00	206,005,859,375.00	166,015,625.00	2,580,078,125.00	1.00

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	510	660	700	800	900	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
40,008,544,921,875	10,400,390,625.00	1,009,765,625.00	1,080,078,125.00	1,080,078,125.00	11,298,828,125.00	106,005,859,375.00	1.00	1.00	110,986,328,125.00	1.00	160,986,328,125.00	12,900,390,625.00	1,259,765,625.00	122,021,484,375.00	106,005,859,375.00	14,599,609,375.00	1,580,078,125.00
79,986,572,265,625	12,099,609,375.00	110,986,328,125.00	10,498,046,875.00	118,994,140,625.00	10,400,390,625.00	114,990,234,375.00	1.00	1.00	1.00	1.00	102,978,515,625.00	106,005,859,375.00	1,169,921,875.00	1.00	10,400,390,625.00	14,501,953,125.00	147,021,484,375.00
1,199,951,171,875	12,998,046,875.00	110,009,765,625.00	10,400,390,625.00	114,990,234,375.00	110,986,328,125.00	1,169,921,875.00	1.00	1.00	1.00	10,498,046,875.00	10,498,046,875.00	102,978,515,625.00	1.00	102,978,515,625.00	1.00	114,990,234,375.00	110,986,328,125.00
17,999,267,578,125	164,013,671,875.00	108,984,375.00	102,978,515,625.00	1.00	110,009,765,625.00	110,986,328,125.00	10,400,390,625.00	10,498,046,875.00	1.00	10,498,046,875.00	1.00	102,001,953,125.00	102,978,515,625.00	1.00	1.00	102,001,953,125.00	1.00
220,001,220,703,125	1,740,234,375.00	108,984,375.00	1,009,765,625.00	1.00	110,986,328,125.00	11,201,171,875.00	106,982,421,875.00	1,169,921,875.00	1.00	1.00	1.00	1.00	102,001,953,125.00	1.00	1.00	110,009,765,625.00	108,984,375.00
239,990,234,375	181,982,421,875.00	110,009,765,625.00	1,009,765,625.00	1.00	108,984,375.00	11,201,171,875.00	1.00	118,017,578,125.00	1.00	1,009,765,625.00	1.00	1.00	1.00	1.00	1.00	11,298,828,125.00	122,021,484,375.00
29,998,779,296,875	181,982,421,875.00	1,080,078,125.00	1.00	1.00	106,005,859,375.00	114,990,234,375.00	1.00	108,984,375.00	11,201,171,875.00	1.00	1,009,765,625.00	102,001,953,125.00	1,009,765,625.00	1.00	114,013,671,875.00	125.00	14,599,609,375.00
600,006,103,515,625	181,982,421,875.00	110,009,765,625.00	1.00	1.00	1.00	122,998,046,875.00	110,009,765,625.00	1.00	102,978,515,625.00	1.00	102,978,515,625.00	106,982,421,875.00	106,982,421,875.00	158,984,375.00	12,099,609,375.00	15,498,046,875.00	202,978,515,625.00
975,006,103,515,625	17,998,046,875.00	110,986,328,125.00	1.00	1.00	1.00	127,978,515,625.00	106,982,421,875.00	1.00	1.00	1.00	10,498,046,875.00	10,400,390,625.00	106,005,859,375.00	183,984,375.00	114,990,234,375.00	15,498,046,875.00	239,013,671,875.00

Initial Supporting table - RandomRevModDecl

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

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

y/x	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
40,008,544,921,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79,986,572,265,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1,199,951,171,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17,999,267,578,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220,001,220,703,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
239,990,234,375	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29,998,779,296,875	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
600,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
975,006,103,515,625	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

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

Value Units: multiplier
X Unit: RPM

y/x	600	900	1,000	1,200	1,400	1,800	2,000	2,800	3,200
1	1.00	1.00	1.00	2,419,921,875.00	1.00	208,984,375.00	114,013,671,875.00	114,013,671,875.00	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 (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	6,500
50,048,828,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - RevMode Decel

29,998,779,296,875	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - Ring Filter

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

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

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

Initial Supporting table - SCD Decel

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

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

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
29,998,779,296,875	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - SCD Jerk

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

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

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
29,998,779,296,875	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - SnapDecayAfterMisfire

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

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

y/x	600	900	1,000	1,200	1,400	1,800	2,000	2,800	3,200
59,375	106,982,421,875.00	1.00	364,990,234,375.00	264,990,234,375.00	12,998,046,875.00	32,001,953,125.00	24,501,953,125.00	1.00	110,009,765,625.00
6,875	106,982,421,875.00	1.00	28,408,203,125.00	280,078,125.00	12,998,046,875.00	289,990,234,375.00	260,009,765,625.00	1.00	1.00
1	106,982,421,875.00	1.00	22,939,453,125.00	269,677,734,375.00	114,990,234,375.00	27,998,046,875.00	264,013,671,875.00	1.00	131,005,859,375.00
1,375	106,982,421,875.00	1.00	134,814,453,125.00	199,609,375.00	189,990,234,375.00	185,009,765,625.00	22,001,953,125.00	12,998,046,875.00	15,498,046,875.00
178,125	106,982,421,875.00	1.00	17,998,046,875.00	17,001,953,125.00	17,001,953,125.00	17,001,953,125.00	2.00	15.00	160,009,765,625.00
309,375	1,080,078,125.00	1.00	13,779,296,875.00	110,009,765,625.00	10,498,046,875.00	164,990,234,375.00	189,990,234,375.00	14,501,953,125.00	139,990,234,375.00
31,298,828,125	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
446,875	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(□SSRoughRoadThres

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	12,075	2,415	36,225	483	60,375	7,245	84,525	966	108,675	12,075	132,825	1,449	156,975	16,905	181,125	1,932
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	510	585	660	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	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00
75	-30,517,578,125.00	-311,279,296,875.00	-494,384,765,625.00	-57,373,046,875.00	-9,521,484,375.00	-108,642,578,125.00	-152,587,890,625.00	-140,380,859,375.00	-1,507,568,359,375.00	-1,690,673,828,125.00	-1,983,642,578,125.00	-726,318,359,375.00	531,005,859,375.00
85	-1,220,703,125.00	-32,958,984,375.00	-567,626,953,125.00	-677,490,234,375.00	-103,759,765,625.00	-155,029,296,875.00	-1,873,779,296,875.00	-1,922,607,421,875.00	-211,181,640,625.00	-3,057,861,328,125.00	-31,005,859,375.00	-1,751,708,984,375.00	-396,728,515,625.00
95	-592,041,015,625.00	-701,904,296,875.00	-360,107,421,875.00	-3,662,109,375.00	-250,244,140,625.00	-5,126,953,125.00	-750,732,421,875.00	-6,591,796,875.00	-5,615,234,375.00	-2,197,265,625.00	18,310,546,875.00	157,470,703,125.00	2,960,205,078,125.00
105	-592,041,015,625.00	-701,904,296,875.00	-360,107,421,875.00	-3,662,109,375.00	-250,244,140,625.00	-5,126,953,125.00	-750,732,421,875.00	-6,591,796,875.00	-5,615,234,375.00	-2,197,265,625.00	18,310,546,875.00	157,470,703,125.00	2,960,205,078,125.00

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	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00	120,001,220,703,125.00
75	1,788,330,078,125.00	3,045,654,296,875.00	4,302,978,515,625.00	5,560,302,734,375.00	68,115,234,375.00	806,884,765,625.00	9,326,171,875.00	1,058,349,609,375.00	118,408,203,125.00	1,309,814,453,125.00	1,435,546,875.00	168,701,171,875.00	19,384,765,625.00
85	9,521,484,375.00	230,712,890,625.00	3,656,005,859,375.00	5,010,986,328,125.00	635,986,328,125.00	771,484,375.00	9,063,720,703,125.00	1,041,259,765,625.00	11,767,578,125.00	13,116,455,078,125.00	14,471,435,546,875.00	1,717,529,296,875.00	19,873,046,875.00
95	4,345,703,125.00	5,731,201,171,875.00	711,669,921,875.00	850,830,078,125.00	9,893,798,828,125.00	11,279,296,875.00	12,664,794,921,875.00	14,056,396,484,375.00	1,544,189,453,125.00	16,827,392,578,125.00	18,212,890,625.00	20,989,990,234,375.00	23,760,986,328,125.00
105	4,345,703,125.00	5,731,201,171,875.00	711,669,921,875.00	850,830,078,125.00	9,893,798,828,125.00	11,279,296,875.00	12,664,794,921,875.00	14,056,396,484,375.00	1,544,189,453,125.00	16,827,392,578,125.00	18,212,890,625.00	20,989,990,234,375.00	23,760,986,328,125.00

Initial Supporting table - Ambient correction on distance

Description: Ambient pressure correction for threshold on Distance covered since last regeneration

Value Units: [0; 2]
X Unit: kPa

y/x	70	72	80	90	92	100
1	1	1	1	1	1	1

Initial Supporting table - Ambient correction on time

Description: Ambient pressure correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: kPa

y/x	70	72	80	90	92	100
1	1	1	1	1	1	1

Initial Supporting table - Distance since last regeneration

Description: Base value to trigger regeneration for distance covered since last regeneration, function of regeneration priority

Value Units: km
X Unit: enumerative (mission profiles)

Distance since last regeneration - Part 1

y/x	CeDPFC_e_RgnPriority_0	CeDPFC_e_RgnPriority_1	CeDPFC_e_RgnPriority_2	CeDPFC_e_RgnPriority_3	CeDPFC_e_RgnPriority_4	CeDPFC_e_RgnPriority_5
1	2,510	2,510	2,510	2,510	2,510	2,510

Distance since last regeneration - Part 2

y/x	CeDPFC_e_RgnPriority_6	CeDPFC_e_RgnPriority_7	CeDPFC_e_RgnPriority_8	CeDPFC_e_RgnPriority_9	CeDPFC_e_RgnPriority_10	CeDPFC_e_RgnPriority_11
1	2,510	2,510	2,510	2,510	2,510	2,510

Distance since last regeneration - Part 3

y/x	CeDPFC_e_RgnPriority_12	CeDPFC_e_RgnPriority_13	CeDPFC_e_RgnPriority_14	CeDPFC_e_RgnPriority_15	CeDPFC_e_RgnPriority_16	
1	2,510	2,510	2,510	2,510	2,510	

Initial Supporting table - DPF Load correction on distance

Description: Map of DPF Load correction for threshold on distance covered since last regeneration

Value Units: [0; 2]
X Unit: % DPF load

y/x	1,999,969,482,421,880	399,993,896,484,375	50	6,999,969,482,421,880	75	79,998,779,296,875	899,993,896,484,375	9,499,969,482,421,880
1	1	1	1	1	1	1	1	1

Initial Supporting table - DPF Load correction on time

Description: Map of DPF Load correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: % DPF load

y/x	1,999,969,482,421,880	399,993,896,484,375	50	6,999,969,482,421,880	75	79,998,779,296,875	899,993,896,484,375	9,499,969,482,421,880
1	1	1	1	1	1	1	1	1

Initial Supporting table - EnginePointEnableDPFTempDeviation

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

y/x	950	1,000	1,200	1,400	1,600	2,400	3,600	5,000
0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1	1
12	0	0	0	0	1	1	1	1
14	0	0	1	1	1	1	1	1
16	0	1	1	1	1	1	1	1
18	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
60	0	1	1	1	1	1	1	1

Initial Supporting table - Lo FR MontrEnblHiThrsh

Description: High enabling threshold on the requested fuel for the flow resistance too low monitoring, function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000
1	150	150	150	150	150	150	150	150

Initial Supporting table - Lo FR MontrEnblLoThrsh

Description: Low enabling threshold on the requested fuel for the flow resistance too low monitoring, function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000
1	5	5	5	5	5	5	5	5

Initial Supporting table - Mission profile correction on distance

Description: Curve of Mission profile dependent correction for threshold on distance covered since last regeneration

Value Units: [0; 2]
X Unit: enumerative (mission profiles)

Mission profile correction on distance - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1	1	1	1	1	1	1

Mission profile correction on distance - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1	1	1	1	1	1	1

Mission profile correction on distance - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17Srv	CeDPFR_e_MisProf18Rec		
1	1	1	1	1	1		

Initial Supporting table - Mission profile correction on time

Description: Curve of Mission profile dependent correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: enumerative (mission profiles)

Mission profile correction on time - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1	1	1	1	1	1	1

Mission profile correction on time - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1	1	1	1	1	1	1

Mission profile correction on time - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	1	1	1	1	1		

Initial Supporting table - P0128 Maximum Acculated Energy - Primary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	35.0	55.0	71.0	82.0
1.0	50,721.0	43,995.0	35,200.0	22,265.0	11,917.0	3,639.0	3,639.0

Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	35.0	55.0	71.0	82.0
1.0	68,768.0	63,425.0	56,437.0	46,161.0	37,940.0	37,940.0	37,940.0

Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTest2

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	35.0	55.0	71.0	82.0
1.0	65,535.0	65,535.0	65,535.0	65,535.0	65,535.0	65,535.0	65,535.0

Initial Supporting table - P01F01- Heat To Coolant Min 2D

Description: KtETHD_P_CDD_HeatToCoolantMin

Value Units: Indicated Power (kW)
X Unit: Firing Fraction
Y Units: Ambient temperature (°C)

y/x	0.00	25.00	5.00	6,669,999,957,084,660.00	1.00
0.0	15.0	15.0	15.0	15.0	15.0
20.0	15.0	15.0	15.0	15.0	15.0
50.0	30.0	30.0	30.0	30.0	30.0
80.0	30.0	30.0	30.0	30.0	30.0
100.0	30.0	30.0	30.0	30.0	30.0

Initial Supporting table - P0126A: Efficiency Offset

Description: Charge Air Cooler Efficiency Offset, function of compressor total flow and water pump speed

Value Units: [%]
X Unit: [g/s]
Y Units: [rpm]

y/x	660	1,000	1,250	1,500	1,750	2,000	2,250
20	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0
250	0	0	0	0	0	0	0

Initial Supporting table - P062B_CSM_ASIC_RAMCorruption_FailLim

Description: Fail Limit for Controller Status Monitoring - ASIC in case of RAM Corruption fail: CeFULD_Cnt_RAMCorruptionFailLim

y/x	1
1	4

Initial Supporting table - P062B_CSM_ASIC_RAMCorruption_SmplLim

Description: Sample Limit for Controller Status Monitoring - ASIC in case of RAM Corruption: CeFULD_Cnt_RAMCorruptionSmplLim

y/x	1
1	5

Initial Supporting table - P062B_CSM_ASIC_TimeOutReached_FailLim

Description: Fail Limit for Controller Status Monitoring - ASIC in case of TimeOut Reached fail: CeFULD_Cnt_TimeOut_FailLim

y/x	1
1	1

Initial Supporting table - P062B_CSM_ASIC_TimeOutReached_SmplLim

Description: Sample Limit for Controller Status Monitoring - ASIC in case of TimeOut Reached: CeFULD_Cnt_TimeOut_SmplLim

y/x	1
1	2

Initial Supporting table - Time since last regeneration

Description: Base value to trigger regeneration for time spent since last regeneration, function of regeneration priority

Value Units: s
X Unit: enumerative (mission profiles)

Time since last regeneration - Part 1

y/x	CeDPFC_e_RgnPriority_0	CeDPFC_e_RgnPriority_1	CeDPFC_e_RgnPriority_2	CeDPFC_e_RgnPriority_3	CeDPFC_e_RgnPriority_4	CeDPFC_e_RgnPriority_5
1	86,400	86,400	86,400	86,400	86,400	86,400

Time since last regeneration - Part 2

y/x	CeDPFC_e_RgnPriority_6	CeDPFC_e_RgnPriority_7	CeDPFC_e_RgnPriority_8	CeDPFC_e_RgnPriority_9	CeDPFC_e_RgnPriority_10	CeDPFC_e_RgnPriority_11
1	86,400	86,400	86,400	86,400	86,400	86,400

Time since last regeneration - Part 3

y/x	CeDPFC_e_RgnPriority_12	CeDPFC_e_RgnPriority_13	CeDPFC_e_RgnPriority_14	CeDPFC_e_RgnPriority_15	CeDPFC_e_RgnPriority_16	
1	86,400	86,400	86,400	86,400	86,400	

Initial Supporting table - Engine Coolant Weight Factor

Description: Weighting factor for cooling fan speed stability based on the Engine Coolant Temperature

Value Units: Dimensionless
X Unit: DegC
Y Units: Dimensionless

y/x	90	94	98	102	106	110	114	118	122
1	95,001,220,703,125	95,001,220,703,125	1	1	95,001,220,703,125	899,993,896,484,375	899,993,896,484,375	899,993,896,484,375	899,993,896,484,375

Initial Supporting table - Input Shaft Speed Weight Factor

Description: Weighting factor for cooling fan speed stability based on input shaft speed

Value Units: Dimensionless
X Unit: RPM
Y Units: Dimensionless

y/x	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0	0	899,993,896,484,375	1	1	1	1	899,993,896,484,375	79,998,779,296,875	699,981,689,453,125	649,993,896,484,375	5,999,755,859,375	399,993,896,484,375	199,981,689,453,125	0	0	0

Initial Supporting table - Input Shaft Stability Factor

Description: Weighting factor for cooling fan speed stability based on input shaft speed changes

Value Units: Dimensionless
X Unit: RPM
Y Units: Dimensionless

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	399,993,896,484,375	600,006,103,515,625	899,993,896,484,375	1	899,993,896,484,375	600,006,103,515,625	399,993,896,484,375	0

Initial Supporting table - Intake Air Temperature [IAT] Weight Factor

Description: Weighting factor for cooling fan speed stability based on Intake Air Temperature (IAT)

Value Units: Dimensionless
X Unit: DegC
Y Units: Dimensionless

y/x	20	30	40	50	60	70	80	90	100
1	1	1	1	1	1	1	95,001,220,703,125	95,001,220,703,125	899,993,896,484,375

Initial Supporting table - P0495 Threshold [EV Fans Only]

Description: Tabulated EV Fan High Speed Thresholds

Value Units: rpm
X Unit: Fan Drive Speed (input shaft speed) rpm
Y Units: Fan Drag Speed (fan speed high limit) rpm

y/x	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	400	775	1,135	1,540	1,960	2,320	2,600	3,000	3,400	3,840	4,224	4,608	5,200	5,600	6,000	6,400	6,800

Initial Supporting table - P10D1_CoilTempRatTempRef

Description:

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

Initial Supporting table - DPSDPHDRatioThrsh

Description:

y/x	100	150	200	250	300	350	450	550	650
0	5	5	5	5	5	5	5	5	5
100,006,103,515,625	5	5	5	5	5	5	5	5	5
29,998,779,296,875	5	5	5	5	5	5	5	5	5
399,993,896,484,375	5	5	5	5	5	5	5	5	5
600,006,103,515,625	5	5	5	5	5	5	5	5	5
899,993,896,484,375	5	5	5	5	5	5	5	5	5
100	5	5	5	5	5	5	5	5	5
129,998,779,296,875	5	5	5	5	5	5	5	5	5

Initial Supporting table - DPS_DPL_Thrsh

Description:

y/x	0	50	100	150	200	250	300	350	500
0	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
20,001,220,703,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
399,993,896,484,375	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
600,006,103,515,625	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
79,998,779,296,875	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
100	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
120,001,220,703,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125
1,399,993,896,484,380	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125	78,125

Initial Supporting table - P0089 Extended Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Metering Unit as function of engine speed (rpm) and extended area is enabled.

y/x	0	850	3,500	4,000	4,500	4,600	5,000	5,067	6,400
1	68	238	238	178	118	68	68	68	68

Initial Supporting table - P2293 Extended Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Pressure Regulator as function of engine speed (rpm) and extended area is enabled.

y/x	0	850	3,500	4,000	4,500	4,600	5,000	5,067	6,400
1	68	238	238	178	118	68	68	68	68

Initial Supporting table - EnginePointEnableDPFTempDeviation

Description:

y/x	950	1,000	1,200	1,400	1,600	2,400	3,600	5,000
0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1	1
12	0	0	0	0	1	1	1	1
14	0	0	1	1	1	1	1	1
16	0	1	1	1	1	1	1	1
18	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
60	0	1	1	1	1	1	1	1

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	45	45	45	45	45	45	45	45	45	45	45	45	45

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	509,765,625	41,015,625	30,078,125	4	4	4	4	4	4	4	4	4

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	118,984,375	12,703,125	123,984,375	15,296,875	18,203,125	20,703,125	228,984,375	28	30,296,875	325
700	118,984,375	12,703,125	141,015,625	158,984,375	18,203,125	20,703,125	228,984,375	28	30,296,875	325
950	118,984,375	12,703,125	16,296,875	178,984,375	19,296,875	20,703,125	228,984,375	28	30,296,875	325
1,200	118,984,375	12,703,125	168,984,375	20	215	231,015,625	24,203,125	288,984,375	30,296,875	325
1,450	118,984,375	12,703,125	168,984,375	20	22,796,875	25,203,125	263,984,375	30,703,125	32	33,796,875
1,700	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	326,015,625	341,015,625	353,984,375
1,950	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	36,203,125	37,796,875
2,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
2,800	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
3,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	70	85	120	130	120	120	110	80

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	87,001,953,125.000	9.000	92,001,953,125.000	10.000

Initial Supporting table - P16BC PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	87,001,953,125.000	9.000	92,001,953,125.000	10.000

Initial Supporting table - EGT_Bank1_Sensor1_Temp MAP

Description:

y/x	-40	-12	16	40	68	96	116	120
1	160	132	104	80	52	24	4	0

Initial Supporting table - EGT_Bank1_Sensor2_Temp MAP

Description:

y/x	-40	-12	16	40	68	96	116	120
1	160	132	104	80	52	24	4	0

Initial Supporting table - EGT_Bank1_Sensor3_Temp MAP

Description:

y/x	-40	-20	0	20	40	60	76	80
1	120	100	80	60	40	20	4	0

Initial Supporting table - EGT_Bank1_Sensor4_Temp MAP

Description:

y/x	-40	-20	-4	16	32	52	68	72
1	110	90	74	54	38	18	2	0

Initial Supporting table - EGT_ERD_B1S1_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S1_CombModeEnbl

Description:

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

Initial Supporting table - EGT_ERD_B1S2_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S2_CombModeEnbl

Description:

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

Initial Supporting table - EGT_ERD_B1S3_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S3_CombModeEnbl

Description:

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

Initial Supporting table - EGT_ERD_B1S4_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S4_CombModeEnbl

Description:

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

Initial Supporting table - EGT_ERD_B1S5_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	120	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S5_CombModeEnbl

Description:

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

Initial Supporting table - P054E_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054EJFM_CombModesEnbl - Part 1

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

P054EJFM_CombModesEnbl - Part 2

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

P054EJFM_CombModesEnbl - Part 3

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

P054EJFM_CombModesEnbl - Part 4

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

Initial Supporting table - P054■E_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	500	600	800	1,050	1,560
-20,040,000,915,527,300	249,765,625	249,765,625	256,015,625	28,640,625	28,640,625
-10,039,999,961,853,000	176,015,625	176,015,625	20	21,234,375	21,234,375
-3,999,999,910,593,030	136,953,125	136,953,125	14,765,625	17,921,875	19,203,125
19,959,999,084,472,700	113,984,375	113,984,375	13,203,125	15,515,625	15,515,625
50	8,796,875	8,796,875	103,984,375	11,296,875	11,296,875
6,995,999,908,447,270	7,515,625	7,515,625	8,484,375	88,203,125	88,203,125

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	500	600	800	1,050	1,560
-20,040,000,915,527,300	22,921,875	22,921,875	24,078,125	2,625	2,625
-10,039,999,961,853,000	181,171,875	181,171,875	192,890,625	20,296,875	20,296,875
-3,999,999,910,593,030	12,796,875	12,796,875	14	14,921,875	14,921,875
19,959,999,084,472,700	86,796,875	86,796,875	9,515,625	1,071,875	1,071,875
50	6,234,375	6,234,375	63,984,375	63,984,375	63,984,375
6,995,999,908,447,270	43,984,375	43,984,375	5	5,203,125	5,203,125

Initial Supporting table - P054E_IFM_MinFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the rninimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	211,640,625	211,640,625	223,984,375	23,296,875	23,296,875
-10,039,999,961,853,000	183,984,375	183,984,375	20,796,875	223,984,375	223,984,375
-3,999,999,910,593,030	136,015,625	136,015,625	16,796,875	19,203,125	19,203,125
19,959,999,084,472,700	116,015,625	116,015,625	146,015,625	17,921,875	17,921,875
50	8,640,625	8,640,625	9,484,375	103,984,375	103,984,375
6,995,999,908,447,270	75,390,625	75,390,625	8,765,625	1,028,125	1,028,125

Initial Supporting table - P054Ez_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	500	600	800	1,050	1,560
-20,040,000,915,527,300	136,015,625	136,015,625	151,171,875	16,640,625	16,640,625
-10,039,999,961,853,000	12,796,875	12,796,875	136,015,625	144,921,875	144,921,875
-3,999,999,910,593,030	10,234,375	10,234,375	115,625	12,796,875	12,796,875
19,959,999,084,472,700	8,796,875	8,796,875	9,203,125	10,234,375	8,796,875
50	63,984,375	63,984,375	8	86,796,875	86,796,875
6,995,999,908,447,270	5	5	5,515,625	5,765,625	5,765,625

Initial Supporting table - P054 tE_IFM_MinFuelIdleV2_G

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	281,953,125	281,953,125	303,984,375	3,171,875	3,171,875
-10,039,999,961,853,000	18,796,875	18,796,875	1,975	214,375	214,375
-3,999,999,910,593,030	12	12	129,609,375	151,171,875	151,171,875
19,959,999,084,472,700	8,796,875	8,796,875	97,265,625	111,953,125	111,953,125
50	8,640,625	8,640,625	91,640,625	10,734,375	10,734,375
6,995,999,908,447,270	659,375	659,375	7,296,875	78,828,125	78,828,125

Initial Supporting table - P054E_IFM_MinFuelIdleV2_PN

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	130,234,375	130,234,375	14	16	16
-10,039,999,961,853,000	10,234,375	10,234,375	119,921,875	13,484,375	13,484,375
-3,999,999,910,593,030	8	8	96,015,625	10	10
19,959,999,084,472,700	63,984,375	63,984,375	65,625	7,203,125	7,203,125
50	56,015,625	56,015,625	61,171,875	6,234,375	6,234,375
6,995,999,908,447,270	4,765,625	4,765,625	5	5,234,375	5,234,375

Initial Supporting table - P054 tE_IFM_MinFuelIdleV3_G

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	281,953,125	281,953,125	303,984,375	3,171,875	3,171,875
-10,039,999,961,853,000	18,796,875	18,796,875	1,975	214,375	214,375
-3,999,999,910,593,030	12	12	129,609,375	151,171,875	151,171,875
19,959,999,084,472,700	8,796,875	8,796,875	97,265,625	111,953,125	111,953,125
50	8,640,625	8,640,625	91,640,625	10,734,375	10,734,375
6,995,999,908,447,270	659,375	659,375	7,296,875	78,828,125	78,828,125

Initial Supporting table - P054E_IFM_MinFuelIdleV3_PN

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	130,234,375	130,234,375	14	16	16
-10,039,999,961,853,000	10,234,375	10,234,375	119,921,875	13,484,375	13,484,375
-3,999,999,910,593,030	8	8	96,015,625	10	10
19,959,999,084,472,700	63,984,375	63,984,375	65,625	7,203,125	7,203,125
50	56,015,625	56,015,625	61,171,875	6,234,375	6,234,375
6,995,999,908,447,270	4,765,625	4,765,625	5	5,234,375	5,234,375

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054FJFM_CombModesEnbl - Part 1

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

P054FJFM_CombModesEnbl - Part 2

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

P054FJFM_CombModesEnbl - Part 3

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

P054FJFM_CombModesEnbl - Part 4

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

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_G

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	60,125	60,125	620,625	653,984,375	653,984,375
-10,039,999,961,853,000	529,296,875	529,296,875	53,390,625	5,528,125	5,528,125
-3,999,999,910,593,030	405,703,125	405,703,125	45,375	5,296,875	5,296,875
19,959,999,084,472,700	401,796,875	401,796,875	4,203,125	511,953,125	511,953,125
50	356,484,375	356,484,375	38,984,375	472,734,375	472,734,375
6,995,999,908,447,270	289,453,125	289,453,125	3,590,625	424,609,375	424,609,375

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	500	600	800	1,050	1,560
-20,040,000,915,527,300	57,125	57,125	578,671,875	618,671,875	618,671,875
-10,039,999,961,853,000	43,453,125	43,453,125	4,415,625	486,328,125	486,328,125
-3,999,999,910,593,030	37,640,625	37,640,625	391,171,875	39,625	39,625
19,959,999,084,472,700	353,515,625	353,515,625	356,953,125	377,109,375	377,109,375
50	30,296,875	30,296,875	295,703,125	318,984,375	318,984,375
6,995,999,908,447,270	271,171,875	271,171,875	276,328,125	27,375	27,375

Initial Supporting table - P054IF_IFM_MaxFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the rnaximum 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	500	600	800	1,050	1,560
-20,040,000,915,527,300	631,953,125	631,953,125	676,953,125	701,171,875	701,171,875
-10,039,999,961,853,000	55,484,375	55,484,375	61,203,125	64,875	64,875
-3,999,999,910,593,030	494,765,625	494,765,625	518,125	57,796,875	57,796,875
19,959,999,084,472,700	421,640,625	421,640,625	469,375	511,953,125	511,953,125
50	355,625	355,625	411,953,125	44,578,125	44,578,125
6,995,999,908,447,270	316,796,875	316,796,875	37,625	43,453,125	43,453,125

Initial Supporting table - P054F⁚_IFM_MaxFuelIdleHC_PN

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	599,921,875	599,921,875	621,015,625	64,859,375	64,859,375
-10,039,999,961,853,000	491,171,875	491,171,875	510,625	577,265,625	577,265,625
-3,999,999,910,593,030	439,765,625	439,765,625	481,796,875	548,046,875	548,046,875
19,959,999,084,472,700	377,578,125	377,578,125	415,234,375	48,640,625	48,640,625
50	323,828,125	323,828,125	37,375	392,109,375	392,109,375
6,995,999,908,447,270	290,390,625	290,390,625	31,828,125	326,171,875	326,171,875

Initial Supporting table - P054IF_IFM_MaxFuelIdleV2_G

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	689,453,125	689,453,125	75,265,625	76,828,125	76,828,125
-10,039,999,961,853,000	62,078,125	62,078,125	72	68,921,875	68,921,875
-3,999,999,910,593,030	487,109,375	487,109,375	574,296,875	625,703,125	625,703,125
19,959,999,084,472,700	420,859,375	420,859,375	514,765,625	576,640,625	576,640,625
50	41,671,875	41,671,875	4,428,125	511,953,125	511,953,125
6,995,999,908,447,270	397,265,625	397,265,625	433,828,125	491,796,875	491,796,875

Initial Supporting table - P054F=_IFM_MaxFuelIdleV2_PN

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	688,046,875	688,046,875	716,875	735,078,125	735,078,125
-10,039,999,961,853,000	583,515,625	583,515,625	597,109,375	61,921,875	61,921,875
-3,999,999,910,593,030	515,703,125	515,703,125	562,265,625	5,746,875	5,746,875
19,959,999,084,472,700	441,953,125	441,953,125	4,646,875	47,296,875	47,296,875
50	373,984,375	373,984,375	3,865,625	397,578,125	397,578,125
6,995,999,908,447,270	35,203,125	35,203,125	36,171,875	36,453,125	36,453,125

Initial Supporting table - P054IF_IFM_MaxFuelIdleV3_G

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	689,453,125	689,453,125	75,265,625	76,828,125	76,828,125
-10,039,999,961,853,000	62,078,125	62,078,125	72	68,921,875	68,921,875
-3,999,999,910,593,030	487,109,375	487,109,375	574,296,875	625,703,125	625,703,125
19,959,999,084,472,700	420,859,375	420,859,375	514,765,625	576,640,625	576,640,625
50	41,671,875	41,671,875	4,428,125	511,953,125	511,953,125
6,995,999,908,447,270	397,265,625	397,265,625	433,828,125	491,796,875	491,796,875

Initial Supporting table - P054F=_IFM_MaxFuelIdleV3_PN

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

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

y/x	500	600	800	1,050	1,560
-20,040,000,915,527,300	688,046,875	688,046,875	716,875	735,078,125	735,078,125
-10,039,999,961,853,000	583,515,625	583,515,625	597,109,375	61,921,875	61,921,875
-3,999,999,910,593,030	515,703,125	515,703,125	562,265,625	5,746,875	5,746,875
19,959,999,084,472,700	441,953,125	441,953,125	4,646,875	47,296,875	47,296,875
50	373,984,375	373,984,375	3,865,625	397,578,125	397,578,125
6,995,999,908,447,270	35,203,125	35,203,125	36,171,875	36,453,125	36,453,125

Initial Supporting table - P0087 Minimum rail pressure

Description: Minimum rail pressure threshold (MPa) as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	450	500	650	660	800	1,000	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,400	4,800
1	0	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145

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	2,250	3,500	4,500	4,600
1	68	238	238	238	118	68

Initial Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Defines which sensor is used as reference for check plausibility of fuel temperature sensor.
(CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_DPF_Snsrllp = Exhaust gas temperature measured upstream the DPF, CeFTSR_e_DPF_SnsrDwn = Exhaust gas temperature measured downstream the DPF.

Value Units: -

y/x	1
1	CeFTSR_e_DPF_SnsrDwn

Initial Supporting table - P228B Pressure Regulator completely closed command

Description: Command, in terms of pressure (MPa), to consider pressure regulator valve completely closed as function of rail pressure (MPa).

Value Units: MPa
X Unit: MPa

y/x	0	125	200	250
1	45	1,825	245	278

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	2,250	3,500	4,500	4,600
1	68	238	238	238	118	68

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 - Rail Pressure Sensor Configuration

Description: Defines which kind of Rail Pressure Sensor configuration is used:
CeFHPG_e_RPS_SingleTrack = RPS with a single rail pressure information
CeFHPG_e_RPS_DoubleTrack = RPS with a redundant rail pressure information

Value Units: -

y/x	1
1	CeFHPG_e_RPS_DoubleTrack

Initial Supporting table - 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	45	45	45	45	45	45	45	45	45	45	45	45	45

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	509,765,625	41,015,625	30,078,125	4	4	4	4	4	4	4	4	4

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	118,984,375	12,703,125	123,984,375	15,296,875	18,203,125	20,703,125	228,984,375	28	30,296,875	325
700	118,984,375	12,703,125	141,015,625	158,984,375	18,203,125	20,703,125	228,984,375	28	30,296,875	325
950	118,984,375	12,703,125	16,296,875	178,984,375	19,296,875	20,703,125	228,984,375	28	30,296,875	325
1,200	118,984,375	12,703,125	168,984,375	20	215	231,015,625	24,203,125	288,984,375	30,296,875	325
1,450	118,984,375	12,703,125	168,984,375	20	22,796,875	25,203,125	263,984,375	30,703,125	32	33,796,875
1,700	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	326,015,625	341,015,625	353,984,375
1,950	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	36,203,125	37,796,875
2,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
2,800	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
3,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	70	85	120	130	120	120	110	80

Initial Supporting table - KaFADR_e_FSA_CombModeEnblGrp

Description: Enable FSA learning based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeEnblGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 2

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

KaFADR_e_FSA_CombModeEnblGrp - Part 3

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

KaFADR_e_FSA_CombModeEnblGrp - Part 4

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

KaFADR_e_FSA_CombModeEnblGrp - Part 5

y/x				
1				

Initial Supporting table - KaFADReFSACombModeRelGrp

Description: Enable FSA correction release based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeRelGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeRelGrp - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeRelGrp - Part 3

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

KaFADR_e_FSA_CombModeRelGrp - Part 4

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

KaFADR_e_FSA_CombModeRelGrp - Part 5

y/x				
1				

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

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

y/x	5	10	20	30	40	50	60	80	100	120
450	118,984,375	12,703,125	123,984,375	15,296,875	18,203,125	20,703,125	228,984,375	28	30,296,875	325
700	118,984,375	12,703,125	141,015,625	158,984,375	18,203,125	20,703,125	228,984,375	28	30,296,875	325
950	118,984,375	12,703,125	16,296,875	178,984,375	19,296,875	20,703,125	228,984,375	28	30,296,875	325
1,200	118,984,375	12,703,125	168,984,375	20	215	231,015,625	24,203,125	288,984,375	30,296,875	325
1,450	118,984,375	12,703,125	168,984,375	20	22,796,875	25,203,125	263,984,375	30,703,125	32	33,796,875
1,700	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	326,015,625	341,015,625	353,984,375
1,950	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	36,203,125	37,796,875
2,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
2,800	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375
3,200	118,984,375	12,703,125	168,984,375	20	22,796,875	26	30	35,296,875	38,203,125	408,984,375

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

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

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - RufCyl Decel

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

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

RufCyl_Decel - Part 1

y/x	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	1,098	8,885	6,995	597	371	2,375	1,995	178	150	1,045	84	65	46
2,001,953,125	8,005	6,055	456	475	328	214	1,675	1,565	1,195	85	645	555	425
3,997,802,734,375	672	5,435	441	403	2,805	184	1,485	1,315	795	68	515	445	375
5,999,755,859,375	6,635	5,375	396	335	2,375	1,805	1,385	110	735	56	435	355	315
8,001,708,984,375	890	6,705	4,865	365	247	189	1,355	1,005	765	505	395	28	275
999,755,859,375	1,041	8,025	575	4,425	286	2,145	156	1,025	82	535	355	28	24
1,199,951,171,875	1,158	9,005	661	5,175	3,425	238	175	105	91	57	355	29	235
1,400,146,484,375	1,270	1,009	746	5,735	395	257	197	1,085	1,035	61	41	315	25
15,997,314,453,125	1,389	1,127	828	630	4,525	285	217	1,375	117	655	52	345	27
17,999,267,578,125	1,579	12,225	9,125	6,925	4,995	3,115	2,365	165	128	76	59	40	285
20,001,220,703,125	1,803	13,015	994	7,465	552	3,395	256	193	144	905	695	46	31
219,970,703,125	19,755	14,065	1,071	818	6,055	3,675	278	2,215	159	102	795	52	335
239,990,234,375	2,117	1,493	1,143	885	6,565	3,965	306	247	174	113	90	58	36
29,998,779,296,875	2,609	18,175	1,363	10,775	795	4,795	381	3,165	214	145	119	745	455
4,000,244,140,625	34,445	23,365	17,195	13,895	10,285	617	497	4,395	284	205	175	104	65
5,999,755,859,375	49,515	3,384	24,645	2,008	1,487	8,925	7,235	6,755	416	297	2,735	165	107
9,749,755,859,375	7,796	5,301	3,867	3,145	2,337	1,408	11,595	11,285	670	4,735	458	2,775	1,835

Initial Supporting table - RufCyl Decel

RufCyl_Decel - Part 2													
y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
50,048,828,125	355	235	215	255	22	17	327,655	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	315	19	195	205	205	15	327,655	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	265	165	17	17	19	135	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	22	145	15	145	175	125	327,655	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	18	13	135	13	16	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	165	13	125	11	15	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	17	14	12	10	135	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	18	15	125	10	13	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	20	165	13	11	13	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	22	18	14	12	13	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	24	20	15	13	135	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	265	22	16	14	14	125	327,655	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	29	24	17	15	15	145	327,655	327,675	327,675	327,675	327,675	327,675	327,675
29,998,779,296,875	36	295	205	175	17	195	327,655	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	48	395	265	23	205	275	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	755	585	39	345	26	43	327,655	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	1,285	935	61	56	36	72	327,655	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - RufCyl Jerk

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

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

RufCyl_Jerk - Part 1

y/x	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	9,085	7,115	564	498	332	224	181	161	138	134	54	66	285
2,001,953,125	693	583	469	426	2,645	1,825	1,415	128	1,165	94	435	505	25
3,997,802,734,375	5,425	4,795	369	3,175	2,185	149	1,235	885	89	59	355	385	205
5,999,755,859,375	4,805	360	313	3,065	202	136	108	835	70	505	34	32	165
8,001,708,984,375	672	548	4,155	3,445	2,125	1,585	107	87	80	46	33	285	19
999,755,859,375	8,265	662	528	450	272	220	144	93	87	49	37	275	205
1,199,951,171,875	930	766	645	5,795	369	2,765	1,865	1,055	94	595	395	27	22
1,400,146,484,375	1,072	9,355	7,805	698	463	3,355	231	1,125	104	675	40	33	235
15,997,314,453,125	1,171	1,022	8,915	814	5,525	393	273	126	1,195	62	445	40	27
17,999,267,578,125	1,303	1,149	10,115	9,325	6,455	450	3,145	156	126	765	55	405	31
20,001,220,703,125	1,467	1,280	11,285	1,045	750	4,935	3,515	1,815	122	825	66	535	35
219,970,703,125	1,572	1,409	12,415	11,595	8,545	5,595	3,885	209	152	89	735	61	395
239,990,234,375	1,713	1,526	1,350	12,695	959	6,295	4,255	2,365	189	97	835	695	445
29,998,779,296,875	2,105	19,615	17,015	15,905	1,280	8,215	528	306	277	135	815	92	575
4,000,244,140,625	2,720	24,535	2,233	2,114	17,575	1,159	699	406	3,835	200	163	116	785
5,999,755,859,375	40,805	38,425	3,379	31,515	27,805	18,085	10,255	6,335	6,075	290	240	2,135	118
9,749,755,859,375	6,573	60,095	5,449	5,101	4,669	30,345	1,615	10,865	1,025	4,755	4,025	3,785	1,925

Initial Supporting table - RufCyl Jerk

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
50,048,828,125	285	26	275	23	185	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
2,001,953,125	22	215	23	205	16	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
3,997,802,734,375	19	175	205	175	14	95	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	165	16	175	15	12	85	327,655	327,675	327,675	327,675	327,675	327,675	327,675
8,001,708,984,375	17	15	165	13	11	85	327,655	327,675	327,675	327,675	327,675	327,675	327,675
999,755,859,375	165	155	155	12	11	85	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,199,951,171,875	18	165	155	125	11	9	327,655	327,675	327,675	327,675	327,675	327,675	327,675
1,400,146,484,375	195	185	165	14	115	95	327,655	327,675	327,675	327,675	327,675	327,675	327,675
15,997,314,453,125	22	205	175	135	12	10	327,655	327,675	327,675	327,675	327,675	327,675	327,675
17,999,267,578,125	255	20	19	16	125	105	327,655	327,675	327,675	327,675	327,675	327,675	327,675
20,001,220,703,125	28	22	20	165	135	11	327,655	327,675	327,675	327,675	327,675	327,675	327,675
219,970,703,125	31	23	21	155	145	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
239,990,234,375	34	255	22	165	155	115	327,655	327,675	327,675	327,675	327,675	327,675	327,675
29,998,779,296,875	43	345	255	185	18	13	327,655	327,675	327,675	327,675	327,675	327,675	327,675
4,000,244,140,625	605	475	305	275	205	15	327,655	327,675	327,675	327,675	327,675	327,675	327,675
5,999,755,859,375	915	715	39	425	31	195	327,655	327,675	327,675	327,675	327,675	327,675	327,675
9,749,755,859,375	153	118	57	72	50	27	327,655	327,675	327,675	327,675	327,675	327,675	327,675

Initial Supporting table - RufSCD Decel

Description: Used for P0300-P0308.   Crankshaft decel threshold while in SCD mode during Idle or GPF regen.   SCD mode uses smaller windows near TDC.   Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04.   PID $04 is not robust to temperature and alititude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

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

RufSCD_Decel - Part 1

y/x	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2,001,953,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
3,997,802,734,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8,001,708,984,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,199,951,171,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,400,146,484,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15,997,314,453,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17,999,267,578,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20,001,220,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
219,970,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
239,990,234,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29,998,779,296,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4,000,244,140,625	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Decel

9,749,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
50,048,828,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2,001,953,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
3,997,802,734,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8,001,708,984,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,199,951,171,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,400,146,484,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15,997,314,453,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17,999,267,578,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20,001,220,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
219,970,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
239,990,234,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29,998,779,296,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4,000,244,140,625	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9,749,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

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

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

RufSCD_Jerk - Part 1

y/x	510	585	660	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
50,048,828,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2,001,953,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
3,997,802,734,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8,001,708,984,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,199,951,171,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,400,146,484,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15,997,314,453,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17,999,267,578,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20,001,220,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
219,970,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
239,990,234,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29,998,779,296,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4,000,244,140,625	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9,749,755,8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

59,375

RufSCD_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
50,048,828,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2,001,953,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
3,997,802,734,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8,001,708,984,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,199,951,171,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
1,400,146,484,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15,997,314,453,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17,999,267,578,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20,001,220,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
219,970,703,125	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
239,990,234,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29,998,779,296,875	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4,000,244,140,625	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
5,999,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9,749,755,859,375	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

Description: Crankshaft Indicated Mean Effective Pressure (IMEP) Estimate that below which will be considered misfire. Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table.
The BinID table's Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: KPa
XUnit: BinID

Misfire_IMEP_Thresh_vs_BinID - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 2

y/x	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 3

y/x	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 4

y/x	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 5

y/x	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 6

y/x	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 7

y/x	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 8

y/x	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 9

y/x	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

Description: Crankshaft Indicated Mean Effective Pressure (IMEP) Estimate that below which will be considered misfire. Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table.
The BinID table's Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: KPa
XUnit: BinID

Misfire_IMEP_Thresh_vs_BinID - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 2

y/x	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 3

y/x	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 4

y/x	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 5

y/x	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 6

y/x	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 7

y/x	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 8

y/x	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Misfire_IMEP_Thresh_vs_BinID - Part 9

y/x	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Component/System	Fault code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Transmission Fluid Temperature								
Transmission Fluid Temperature Sensor Circuit Performance	P0711	TFT Performance Test The first case Startup delta test monitors the sump temperature sensor to determine if it is changing too little for the operating environment of the transmission. The diagnostic makes sure that temperature is changing and not stuck at a value. The first case runs to completion once each drive cycle. The Noise Test compares the sample to sample delta to a noise calibration and then fails if there is enough fail counts in a given sampling period.	Case 1: Stuck Sensor The test takes a sample of temperature at startup and uses that as an index into tables to set limits on how much of a change in temperature required over a period of time	 0 · 1 796gdeg C 100 - 1200 seconds	Not Test Failed This Key On Battery Voltage between TCM and Engine has been running for at least Engine speed Output speed	P0711 P0712 P0713 P0715 P0716 P0717 P0720 P0721 P0722 9 V and 18 V 2 seconds >= 450 RPM >=100 RPM	2.5 seconds frequency 250 ms	Two Trips
			Case 2: Noise Test Change from previous for	 >= 20 deg. C 14 events				
		TFT Performance Delta Test This diagnostic test monitors the sump temperature sensor to determine if it is changing too little for the operating environment of the transmission. The diagnostic makes sure that temperature is changing and not stuck at a value. The diagnostic test runs to completion once each drive cycle.	Case 3: Short Term Delta Temp This test samples the initial sump temperature every THEN compares the absolute value of the difference between the initial sump temperature and the value at the end of to compare the absolute value difference between the two values absolute value difference	 6 seconds 6 seconds >= 40	Not Test Failed This Key On Battery Voltage between Engine speed Output speed	P0711 P0712 P0713 9 V and 18 V >= 450 RPM >=100 RPM	6 seconds frequency 250 ms	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Transmission Fluid Temperature Sensor Circuit Low	P0712	Out of range low.	Transmission Fluid Temperature for a time	>=150 deg. C > 2.5 seconds.	Not Test Failed This Key On Battery Voltage between	P0711 P0712 P0713 9 V and 18 V	2.5 seconds frequency 250 ms	Two Trips
Transmission Fluid Temperature Sensor Circuit High	P0713	Out of range high.	Transmission Fluid Temperature for a time	<= -45 deg. C > 2.5 seconds	Not Test Failed This Key On Battery Voltage between IF Engine run time OR Engine Coolant Temperature for a time	P0711 P0712 P0713 9 V and 18 V >= 600 seconds >= 20 deg. C >= 20 seconds	2.5 seconds frequency 250 ms	Two Trips
Speed Sensors								
Turbine Speed Sensor Circuit	P0715	This test detects a Turbine Speed Sensor circuit short to battery, ground, or open.	Turbine speed sensor circuit hardware monitor state for	= Fault 100 samples	Not Test Failed This Key On Fire Truck application AND Not Pumping	P0715	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Turbine Shaft Speed Sensor Circuit Performance	P0716	Turbine Speed Sensor Performance Test This test detects large changes in Turbine Speed and noisy Turbine Speed by comparing to calibration values.			Not Test Failed This Key On No Fault Pending DTCs for this drive cycle. Fire Truck application AND Not Pumping	P0715 P0716 P0717 P0720 P0721 P0722 P0720 P0721 P0722	frequency 20 ms	One Trip
			Casel: (Unrealistically large changes in turbine speed) If Turbine Speed Change for	 >= 800 RPM >=0.15 seconds			0.15 seconds	
			Case 2: (Noisy Turbine Speed) For sample size IF the change in Turbine Speed THEN the Low Counter is incremented IF the change in Turbine Speed THEN the High Counter is incremented This test fails if both the Low Counter and the High Counter OR Low Counter OR High Counter	 80 <= -800 RPM >= 800 RPM >= 5 >= 5 >= 5			1.6 seconds	
			Case 3: (Wires to speed sensors electromagnetically coupled) Fault Pending will be set when turbine speed change AND Last Valid Speed This test fails when Fault pending is set AND turbine speed	 >=8192 >= 200 <61	Turbine speed for a time AND Shift is completed	> 200 RPM >= 0.5 seconds	0.14 seconds	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
			When range is attained if: Speed sensor wires electromagnetically coupled counter AND Turbine speed change OR for a time AND Speed sensor wires electromagnetically coupled fail counter	 >= 4 > High Limit <= Low limit < 2 counts >= 3				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Turbine Shaft Speed Sensor Circuit No Activity	P0717	This test detects unrealistically low value of turbine speed or unrealistically large changes in turbine speed.	This test fails if turbine speed AND output speed for a time	< 61 RPM > 500 RPM > 1 second.	Not Test Failed This Key On No Fault Pending DTCs No hydraulic default condition exists due to loss of ignition voltage Engine Speed between for a time Forward range attained, NOT reverse or neutral AND transmission output speed During a shift in progress, transmission output speed AND Engine speed Fire Truck application AND Not Pumping	P0717 P0729 P0731 P0732 P0733 P0734 P0735 P0736 P0720 P0721 P0722 P0720 P0721 P0722 200 and 8500 RPM 5 seconds >= 150 RPM >= 150 RPM >= 400 RPM	1 second frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Output Shaft Speed Sensor Circuit	P0720	This test detects a Hall Effect output speed sensor short to battery, short to ground, or open circuit failure. This test verifies that the Hall Effect output speed sensor circuit current is between a low and high threshold. Tests for rapid direction change and error.	All Cases		Not Test Failed This Key On	P0720	frequency 20 ms	One Trip
			Case 1 (Circuit Test) Output speed sensor current OR Output speed sensor current for	 > 17 A <= 5 A 0.4 sec	Range Attained	= Forward, Reverse, or Neutral	0.4 seconds	
			Case 2 (Direction Change) Direction Change Mismatch Time	 > 0.1 sec	Transmission in range or Neutral Output Speed	 >= 50	0.1 second	
			Case 3 (Direction Error) HE Output Speed Sensor direction is Error for	 0.25 sec	Transmission in range or Neutral Output Speed	 >= 50	0.25 seconds	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Output Shaft Speed Sensor Circuit Performance	P0721	This test detects a noisy output speed sensor or circuit by detecting large changes in output speed.	All Cases		Not Test Failed This Key On	P0715 P0716 P0717 P0720 P0721 P0722	frequency 20 ms	One Trip
					No Fault Pending DTCs for this drive cycle	P0715 P0716 P0717		
					Shift complete AND range attained NOT neutral			
			Casel: (Unrealistically large change in output speed)				0.15 seconds	
			Change in output speed	>= 500 RPM				
			for a time	>=0.15 seconds				
			Case 2: (Noisy output speed)				1.6 seconds	
			For sample size	80				
			IF the change in output speed	<= -500 RPM				
			THEN the Low Counter is incremented.					
			IF the change in output speed	>= 500 RPM				
			THEN the High Counter is incremented.					
			Test fails if both the Low Counter and the High Counter	>= 5				
			OR					
			the Low Counter	>= 5				
			OR					
			the High Counter	>= 5				
			Case 3: (Wires to speed sensors electromagnetically coupled)		Output Speed	> 200 RPM	0.14 seconds	
					for a time	>= 0.5 seconds		
			Fault Pending will be set when output speed change	>=8192				
			AND					
			Last Valid Speed	>= 200				
			This test fails when Fault pending is set					
			AND					
			output speed	< 61				
			When range is attained if:					
			Speed sensor swapped counter	>= 4				
			AND					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
			Output speed change OR for a time AND Speed sensor swapped fail counter	> High Limit <= Low limit < 2 counts >= 3				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Output Shaft Speed Sensor Circuit No Signal	P0722	This test detects unrealistically low value of output speed or unrealistically large change in output speed.	All Cases		Not Test Failed This Key On	P0720 P0721 P0722		One Trip
			Case 1: (Rapid Deceleration)		Transmission output speed for a time	>= 500 RPM >= 2 seconds	2 seconds	
			Failure pending if change in output speed	>= 500 RPM	Test disabled when output speed for a time	<= 500 RPM > 1 seconds		
			Failure sets if fail pending and range attained is Neutral					
			Case 2: (No Activity or Gear Disengagement)					
			Failure pending if output speed	< 61 RPM	Not Test Failed This Key On	P0731 P0732 P0733 P0734 P0735 P0729 P0736	1 seconds	
			Failure sets if fail pending AND (net engine torque	> 80 Nm				
			OR net engine torque)	< -50 Nm				
			for a time	> 1 second				
					Not Test Failed This Key On	P0715 P0716 P0717		
					No Fault Pending DTCs for this drive cycle	P0715 P0716 P0717		
					Engine is running Shift not in process Range attained is not Neutral Reverse to Neutral shift not in process			
					Transmission input speed	>= 1050 RPM		
					PRNDL State is in a valid forward range AND Manual Selector Valve is verified in drive			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Output Shaft Direction Plausibility	P27B4	This test detects implausible behavior from the output speed sensor by comparing the measured output direction signal to the equivalent output shaft direction derived from solenoid and pressure switch states.	Sensed direction for	/= equivalent direction 1 second	Not Failed This Key On and No Fault Pending	Solenoid Faults (table 1)	1 second frequency 20 ms	One Trip
					Not Fault Active	P0721 P0720 P0722		
					Not Failed This Key On and No	P0842 P0843 P0847 P0848 P0872 P0873 P0877 P0878 P0751 P0752 P0756 PO757 P0761 P0762		
					Not Failed This Key On and No	HSD Faults		
					Not Failed This Key On and No	P0729 P0731 P0732 P0733 P0734 P0735 P0736		
					Battery Voltage NOT between	9 V and 18 V		
					Output speed	>50		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Output Shaft Speed Sensor Plausibility	P27B6	This test detects implausible behavior from the output speed sensor by comparing the measured output speed signal to the equivalent output speed derived from the turbine speed sensor and the current gear ratio.	|Raw Output Speed - Equivalent Output Speed| for a time	>= 10 >= 10 seconds	Not Failed This Key On and No Fault Pending Not Failed This Key On Not Failed This Key On and No Fault Pending Battery Voltage NOT between Output speed Transmission Range NOT Neutral Transmission NOT shifting	P0720 P0721 P0722 P0731 P0732 P0733 P0734 P0735 P0729 P0736 P0715 P0716 P0717 9 V and 18 V >= 50	10 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Range Verification								
Gear 1 Incorrect Ratio	P0731	This test verifies the transmission is maintaining proper ratio while in First range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in first range AND output speed AND gear slip When test error is indicated the pass timer is cleared and the fail timer starts accumulating. Fault pending is set when fail timer Diagnostic code set when fail timer	 >= 100 RPM > 100 RPM >0 >= 2 seconds	Not Failed This Key On Not responding to Test Failed This Key On No Fault Pending DTC for this drive cycle. No hydraulic default Gears are commanded No range switch failure response active TCM not initializing or shutting down Output speed	P0731 P0877 P0878 P0715 P0716 P0717 P0720 P0721 P0722 P0715 P0717 P0720 P0722 >= 200 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Gear 2 Incorrect Ratio	P0732	This test verifies the transmission is maintaining proper ratio while in Second range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in second range AND output speed AND gear slip When test error is indicated the pass timer is cleared and the fail timer starts accumulating. Fault pending is set when fail timer Diagnostic code set when fail timer	 >= 100 RPM > 100 RPM >0 >= 2 seconds	Not Failed This Key On Not responding to Test Failed This Key On No Fault Pending DTC for this No hydraulic default Gears are commanded No Range Shift is in process No range switch failure response active TCM not initializing or shutting down Output speed	P0732 P0877 P0878 P0715 P0716 P0717 P0720 P0721 P0722 P0715 P0717 P0720 P0722 >= 200 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Gear 3 Incorrect Ratio	P0733	This test verifies the transmission is maintaining proper ratio while in Third range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in third range		Not Failed This Key On	P0733 P0877 P0878	2 seconds	One Trip
			AND					
			output speed	>= 100 RPM			frequency 20 ms	
			AND		Not responding to Test Failed This Key On	P0715 P0716 P0717 P0720 P0721 P0722		
			gear slip	> 100 RPM				
			When test error is indicated the pass timer is cleared and the fail timer starts accumulating.					
			Fault pending is set when fail timer	>0	No Fault Pending DTC for this	P0715 P0717 P0720 P0722		
			Diagnostic code set when fail timer	>= 2 seconds				
					No hydraulic default Gears are commanded			
					No Range Shift is in process			
					No range switch failure response active			
					TCM not initializing or shutting down			
					Output speed	>= 200 RPM		
					Fire Truck application AND Not Pumping			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Gear 4 Incorrect Ratio	P0734	This test verifies the transmission is maintaining proper ratio while in Fourth range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in fourth range		Not Failed This Key On	P0734 P0877 P0878	2 seconds frequency 20 ms	One Trip
			AND					
			output speed	>= 100 RPM				
			AND					
			gear slip	> 100 RPM	Not responding to Test Failed This Key On	P0715 P0716 P0717 P0720 P0721 P0722		
			When test error is indicated the pass timer is cleared and the fail timer starts accumulating.					
			Fault pending is set when		No Fault Pending DTC for this	P0715 P0717 P0720 P0722		
			fail timer	>0				
			Diagnostic code set when					
			fail timer	>= 2 seconds				
					No hydraulic default Gears are commanded			
					No Range Shift is in process			
					No range switch failure response active			
					TCM not initializing or shutting down			
					Output speed	>= 200 RPM		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Gear 5 Incorrect Ratio	P0735	This test verifies the transmission is maintaining proper ratio while in Fifth range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in fifth range AND output speed AND gear slip When test error is indicated the pass timer is cleared and the fail timer starts accumulating. Fault pending is set when fail timer Diagnostic code set when fail timer	 >= 100 RPM > 100 RPM >0 >= 2 seconds	Not Failed This Key On Not responding to Test Failed This Key On No Fault Pending DTC for this No hydraulic default Gears are commanded No Range Shift is in process No range switch failure response active TCM not initializing or shutting down Output speed	P0735 P0877 P0878 P0715 P0716 P0717 P0720 P0721 P0722 P0715 P0717 P0720 P0722 >= 200 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Gear 6 Incorrect Ratio	P0729	This test verifies the transmission is maintaining proper ratio while in Sixth range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in sixth range AND output speed AND gear slip When test error is indicated the pass timer is cleared and the fail timer starts accumulating. Fault pending is set when fail timer Diagnostic code set when fail timer	 >= 100 RPM > 100 RPM >0 >= 2 seconds	Not Failed This Key On Not responding to Test Failed This Key On No Fault Pending DTC for this No hydraulic default Gears are commanded No Range Shift is in process No range switch failure response active TCM not initializing or shutting down Output speed	P0729 P0877 P0878 P0715 P0716 P0717 P0720 P0721 P0722 P0715 P0717 P0720 P0722 >= 200 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Reverse Incorrect Ratio	P0736	This test verifies the transmission is maintaining proper ratio while in Reverse range by comparing computed gear ratio to the commanded gear ratio.	Test Error is indicated when the transmission is in reverse range AND output speed AND gear slip When test error is indicated the pass timer is cleared and the fail timer starts accumulating. Fault pending is set when fail timer Diagnostic code set when fail timer	 >= 100 RPM > 100 RPM >0 >= 2 seconds	Not Failed This Key On Not responding to Test Failed This Key On No Fault Pending DTC for this No hydraulic default Gears are commanded No Range Shift is in process No range switch failure response active TCM not initializing or shutting down Output speed	P0736 P0877 P0878 P0715 P0716 P0717 P0720 P0721 P0722 P0715 P0717 P0720 P0722 >= 200 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Torque Converter								
Torque Converter Clutch (TCC) System Stuck Off	P0741	This test detects the torque converter being stuck off (unlocked) by comparing TCC slip speed to a calibration value.	TCC Slip for a time	>= 80 RPM >= 15 seconds.	Not Test Failed This Key On	P2761 P2763 P2764 P0720 P0721 P0722 P0715 P0716 P0717 P0741	15 seconds frequency 100 ms	Two Trips
					No Fault Pending DTCs for this drive cycle.	P2761 P2763 P2764 P0720 P0721 P0722 P0715 P0716 P0717		
					Battery Voltage between	9 V and 18 V		
					Engine Speed between for	200 RPM and 8500 RPM 5 seconds		
					Must be in forward range			
					Accelerator position	>= 10 % and <= $3.40282x10^{38}$ %		
					Transmission fluid temperature	>= 5 deg. C and <= 130 deg. C		
					Time Since Range Change AND Lockup apply is in process or complete AND Commanded TCC pressure	>= 6 seconds >= 1000 kPa		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Torque Converter Clutch (TCC) System Stuck On	P0742	This test detects the torque converter being stuck on (locked) by comparing TCC slip speed to a calibration value.			Not Test Failed This Key On	P2761 P2763 P2764 P0715 P0716 P0717 P0720 P0721 P0722 U0100	frequency 100 ms Case 1: 2 Seconds	Two Trips
			Casel: (High Torque and high throttle fast fail)					
			Accerlrator Position	>= 70 %				
			AND					
			net engine torque	>= 2200 Nm				
			for a time	>= 2 seconds				
			Case 2: (High Output Shaft Acceleration fast fail)		No Fault Pending DTCs for this drive cycle.	P2761 P2763 P2764 P0715 P0716 P0717 P0720 P0721 P0722 U0100	Case 2: 5 Seconds	
			output shaft acceleration	>= 100 RPM/second				
			for a time	>= 5 seconds				
			Case 3: (Accel/Decel/Accel condition)		Battery Voltage between	9 V and 18 V	Case 3: 4 Seconds	
			Report malfunction when output acceleration event is followed by output deceleration event and followed by another output acceleration event. An output acceleration event occurs when output shaft acceleration	>= 40 RPM/second	Engine Speed between	200 RPM and 8500 RPM		
					for	5 seconds		
					Must be in forward range			
			for a time	>= 4 seconds	TCC is commanded off			
					Engine Speed is not defaulted			
			An output deceleration event occurs when output shaft acceleration is	<=-40 RPM/second	TCC Slip	>=-20 RPM and <= 20 RPM		
			for a time	>= 2.5 seconds.				
					Accelerator position	>= 25 %		
					Net Engine Torque	>= 175 Nm		
					Turbine speed	<= 3500 RPM		
					Engine speed	<= 3500 RPM		
					Output speed	>= 100 RPM		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Switches								
Transmission Fluid Pressure Switch 1 Circuit Low	P0842	This test compares the commanded valve position to the pressure switch PS1 feedback, (part of S1 valve integrity test)	Pending failure occurs when PS1 pressure switch indicates stroked for a time In response to the pending failure, S1 valve is retried by triggering S1 valve command to stroked and back to destroked. If PS1 pressure switch continues to indicate stroked, then one of three malfunction cases exists: For Case 1 (electrical malfunction), SS1 Circuit Low reports failure, also. For Case 2 (mechanical malfunction), Shift Solenoid 1 (SS1) Valve Performance - Stuck On reports failure, also. For Case 3 (intermittent malfunction), SS1 valve retry attempted AND PS1 pressure switch continues to indicate stroked.	>= 0.125 seconds P0973 P0752 15 times	Not Test Failed This Key On S1 valve is destroked NOT system initialization in Cold Mode where Transmission Fluid Temperature Shutdown is NOT in process	P0842 < -25 deg. C	0.125 seconds frequency 20 ms	One Trip
Shift Solenoid 1 Valve Performance - Stuck Off	P0751	This test compares the change of state of the valve command to the change of state of the PS1 pressure switch feedback, (part of the S1 valve timeout test)	S1 valve is commanded from destroked to stroked and the PS1 pressure switch indication remains destroked for a time WITH transmission fluid temperature (Time increases as temperature decreases with maximum time at transmission fluid temperature)	>= 5 seconds >= 0 deg. C 11.95 seconds <= -40 deg. C	Not Test Failed This Key On S1 valve commanded from destroked to stroked and SS1 solenoid pressurized	P0751	5 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Shift Solenoid 1 (SS1) Valve Performance - Stuck On	P0752	This test compares the change of state of the valve command to the change of state of the PS1 pressure switch feedback, (part of the S1 valve timeout test).	S1 valve commanded from stroked to destroked and the PS1 pressure switch indication remains stroked for a time WITH transmission fluid temperature (Time increases as temperature decreases with maximum time at transmission fluid temperature)	> 6.8496 seconds >= 0 deg. C. 11 seconds <= -40 deg. C	Not Test Failed This Key On S1 valve changes from stroked to destroked and the solenoid must be commanded to exhaust	P0752	6.8496 seconds frequency 20 ms	One Trip
Transmission Fluid Pressure Switch 1 Circuit High	P0843	This test compares the commanded valve position to the pressure switch PS1 feedback, (part of S1 valve integrity test)	Pending failure occurs when PS1 pressure switch indicates destroked for a time In response to the pending failure, S1 valve is retried by triggering S1 valve command to destroked and back to stroked. If the PS1 pressure switch continues to indicate destroked, then one of three malfunction cases exists. For Case 1 (electrical malfunction), SS1 Control Circuit Low reports failure, also. For Case 2 (mechanical malfunction), Shift Solenoid 1 (SS1) Valve Performance - Stuck Off reports failure, also. For Case 3 (intermittent malfunction), S1 valve retry attempted AND PS1 pressure switch continues to indicate destroked.	>= .070313 seconds P0973 P0751 15 times	Not Test Failed This Key On S1 valve is stroked NOT system initialization in Cold Mode where Transmission Fluid Temperature Shutdown NOT in process	P0843 < -25 deg. C	0.070313 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Pressure Switch Solenoid 2 Circuit Low	P0847	This test compares the commanded valve position to the PS2 pressure switch feedback (part of the S2 valve integrity test).	Pending failure occurs when PS2 pressure switch indicates stroked for a time In response to the pending failure, S2 valve is retried by triggering S2 valve command to stroked and back to destroked. If PS2 pressure switch continues to indicate stroked, then one of three malfunction cases exists. For Case 1 (electrical malfunction), SS2 Control Circuit Low reports failure, also. For Case 2 (mechanical malfunction), Shift Solenoid 2 Valve Performance - Stuck On reports failure, also. For Case 3 (intermittent malfunction), S2 valve retry attempted AND PS2 pressure switch continues to indicate stroked.	>= .039063 seconds P0976 P0757 2 times	Not Test Failed This Key On S2 valve is destroked NOT system initialization in Cold Mode where Transmission Fluid Temperature Shutdown NOT in process	P0847 < -25 deg. C	0.039063 seconds frequency 20 ms	One Trip
Shift Solenoid 2 Valve Performance - Stuck Off	P0756	This test compares the change of state of the valve command to the change of state of the PS2 pressure switch feedback (part of the S2 valve timeout test).	If the S2 valve is commanded from destroked to stroked and the PS2 pressure switch indication remains destroked for a time WITH transmission fluid temperature (Time increases as temperature decreases with maximum time at transmission fluid temperature)	>= 5 seconds >= 0 deg. C. 11.95 seconds <= -40 deg. C.	Not Test Failed This Key On S2 valve commanded from destroked to stroked and SS2 solenoid pressurized	P0756	5 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid 2 Valve Performance - Stuck On	P0757	This test compares the change of state of the valve command to the change of state of the PS2 pressure switch feedback (part of the S2 valve timeout test).	S2 valve commanded from stroked to destroked and the PS2 pressure switch does not indicate destroked for a time WITH transmission fluid temperature (Time increases as temperature decreases with maximum time at transmission fluid temperature)	>= 6.4004 seconds >= 0 deg. C. 15 seconds <= -40 deg. C.	Not Test Failed This Key On S2 valve changes from stroked to destroked and the solenoid must be commanded to exhaust	P0757	6.4004 seconds frequency 20 ms	One Trip
Transmission Fluid Pressure Switch 2 Circuit High	P0848	This test compares the commanded valve position to the PS2 pressure switch feedback (part of the S2 valve integrity test).	Pending failure occurs when PS2 pressure switch indicates destroked for a time In response to the pending failure, S2 valve is retried by triggering S2 valve command to destroked and back to stroked. If PS2 pressure switch continues to indicate destroked, then one of three malfunction cases exists. For Case 1 (electrical malfunction), SS2 Control Circuit Low reports failure, also. For Case 2 (mechanical malfunction), Shift Solenoid 2 Valve Performance - Stuck Off reports failure, also. For Case 3 (intermittent malfunction), S2 valve retry attempted AND PS2 pressure switch continues to indicate destroked.	>= 0.30078 seconds P0976 P0756 2 times	Not Test Failed This Key On S2 valve is stroked NOT system initialization in Cold Mode where Transmission Fluid Temperature Shutdown NOT in process	P0848 < -25 deg. C	0.30078 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Switch Solenoid 3 Circuit Low	P0872	This test compares the commanded valve position to the pressure switch PS3 feedback, (part of S3 valve integrity test)	Pending failure occurs when PS3 pressure switch indicates stroked for a time In response to the pending failure, S3 valve is retried by triggering S3 valve command to stroked and back to destroked. If PS3 pressure switch continues to indicate stroked, then one of three malfunction cases exists. For Case 1 (electrical malfunction), SS3 Control Circuit Low reports failure, also. For Case 2 (mechanical malfunction), Shift Solenoid 3 Valve Performance - Stuck On reports failure, also. For Case 3 (intermittent malfunction), S3 valve retry attempted AND PS3 pressure switch continues to indicate stroked.	> 0.0195 seconds P0979 P0762 2 times	Not Test Failed This Key On S3 valve is destroked NOT system initialization in Cold Mode where Transmission Fluid Temperature Shutdown NOT in process	P0872 < -25 deg. C	0.0195 seconds frequency 20 ms	One Trip
Shift Solenoid 3 Valve Performance - Stuck Off	P0761	This test compares the change of state of the valve command to the change of state of the PS3 pressure switch feedback, (part of the S3 valve timeout test)	If the S3 valve is commanded from destroked to stroked and the PS3 pressure switch indication remains destroked for a time WITH transmission fluid temperature (Time increases as temperature decreases with maximum time at transmission fluid temperature)	>= 5 seconds >= 0 deg. C. 11.95 seconds <= -40 deg. C.	Not Test Failed This Key On S3 valve commanded from destroked to stroked and SS3 solenoid pressurized	P0761	5 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Shift Solenoid 3 Valve Performance - Stuck On	P0762	This test compares the commanded valve position to the PS3 pressure switch feedback (part of the S3 valve timeout test).	S3 valve commanded from stroked to destroked and the PS3 pressure switch does not indicate destroked for a time WITH transmission fluid temperature (Time increases as temperature decreases with maximum time at transmission fluid temperature)	> 6.5996 seconds >= 0 deg. C. 21.95 seconds >= -40 deg. C.	Not Test Failed This Key On S3 valve changes from stroked to destroked and the solenoid must be commanded to exhaust	P0762	6.5996 seconds frequency 20 ms	One Trip
Pressure Switch Solenoid 3 Circuit High	P0873	This test compares the commanded valve position to the pressure switch PS3 feedback, (part of S3 valve integrity test)	Pending failure occurs when PS3 pressure switch indicates destroked for a time In response to the pending failure, S3 valve is retried by triggering S3 valve command to destroked and back to stroked. If PS3 pressure switch continues to indicate destroked, then one of the three malfunction cases exists. For Case 1 (electrical malfunction), SS3 Control Circuit Low reports failure, also. For Case 2 (mechanical malfunction), Shift Solenoid 3 Valve Performance - Stuck Off reports failure, also. For Case 3 (intermittent malfunction), S3 valve retry attempted AND PS3 pressure switch continues to indicate destroked.	> 0.30078 seconds P0979 P0761 2 times	Not Test Failed This Key On S3 valve is stroked NOT system initialization in Cold Mode where Transmission Fluid Temperature Shutdown NOT in process	P0873 < -25 deg. C	0.30078 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Transmission Fluid Pressure Switch 4 Circuit Low	P0877	This test detects Reverse Pressure Switch closed indication by comparing the Reverse Pressure Switch (ps4) state to the PRNDL switch state.	Case 1: (Forward range) For a sample size (if dropout suspected use sample size) PRNDL is P, D1, D2, D3, D4, D5, D6, T8, or T4 AND RPS indicates Reverse for a time (if dropout suspected use time)	 100 samples 255 samples >= 1 seconds 30 seconds	All Cases Not Test Failed This Key On No Fault Pending DTCs for this drive cycle Engine Speed between for	 P0877 P0878 P0708 P0708 200 RPM and 8500 RPM 5 seconds	1 second frequency 50 ms	One Trip
			Case 2: (Forward range indefinite) For a sample size, net engine torque AND PRNDL is indefinitely D3 or another forward range for a time	 20 samples >= 100 Nm > 1 second				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Transmission Fluid Pressure Switch 4 Circuit High	P0878	This test detects the Reverse Pressure switch (PS4)being stuck in the open position by comparing to the PRNDL switch state and detects the Reverse Pressure switch stuck open at shutdown.	All Cases		Not Test Failed This Key On	P0878	frequency 50 ms	One Trip
			Case 1: (RPS State and PRNDL State do not agree) For sample size PRNDL is REVERSE AND RPS indicates NOT REVERSE after a time	 40 samples >= 1 second	PRNDL State is in reverse		1 second	
			For Case 2: (RPS Shutdown Test) If RPS indicates for a time This time varies with transmission fluid temperature	 not Reverse >= 5-30 seconds	Transmission Fluid Temperature Ignition state is OFF Engine was cranking or running this ignition cycle	>= 0 deg. C	5-30 seconds	
			For Case 3: (High Ratio Test) If current transmission ratio is within the reverse range ratio for a time AND net engine torque for a time	 >= 0.5 seconds >= 100 Nm 1 second	1st range attained and RPS State in forward Output speed is	 >= 100 RPM	1 second	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
On-coming/Off-going								
Pressure Control Solenoid (PCS) 1 Stuck Off	P2723	This test determines if the on-coming clutch energized by Pressure Control Solenoid 1 engages during a forward range shift.	Pending failure occurs when accumulated event timer Timer accumulates when transmission is shifting AND output speed AND commanded gear slip speed (For rough road conditions, use) In response of pending failure, a diagnostic response range is commanded. During this command, this test fails if fail timer and output speed	> 0 seconds >= 60 RPM >= 75 RPM 150 RPM. >= 2 seconds >= 300 RPM	Not Test Failed This Key On Output Speed Turbine Speed Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch failure response active No Cold Mode operation On-coming clutch control enabled Power downshift abort to previous range NOT active Range shift in process Fire Truck application AND Not Pumping	P2723 P0720 P0721 P0722 P0715 P0716 P0717 P0708 P0877 P0878 >= 125 RPM >= 60 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Pressure Control Solenoid (PCS) 2 Stuck Off	P0776	This test determines if the on-coming clutch energized by Pressure Control Solenoid 2 engages during a forward range shift.	Pending failure occurs when accumulated event timer Timer accumulates when transmission is shifting, output speed AND commanded gear slip speed (For rough road conditions, use) In response of pending failure, a diagnostic response range is commanded. During this command, this test fails if fail timer and output speed	>= 0 seconds >= 60 RPM > 75 RPM 150 RPM. >= 2 seconds >= 300 RPM	Not Test Failed This Key On Output Speed Turbine Speed Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch failure response active No Cold Mode operation On-coming clutch control enabled Power downshift abort to previous range NOT active Range shift in process Fire Truck application AND Not Pumping	P0776 P0720 P0721 P0722 P0715 P0716 P0717 P0708 P0877 P0878 >= 125 RPM >= 60 RPM	2 seconds frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Control Solenoid (PCS) 1 Stuck On	P2724	This test determines if the off-going clutch energized by (PCS1) Pressure Control solenoid 1 remains engaged during a forward range shift.	Accumulated fail timer 1-to-2 upshifts; OR accumulated fail timer for other forward range upshifts; OR accumulated fail timer for forward range closed throttle downshift; OR accumulated fail timer for forward downshifts above closed throttle. Fail timer accumulates during range to range shifts when attained gear slip speed	>= 0.2998 seconds >= 0.5 seconds >= 0.5 seconds >= 1.0 second <= 25 RPM	Not Test Failed This Key On Output Speed Turbine Speed Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch failure response active No Cold Mode operation Offgoing clutch shift in progress controlled by PCS1 Range Shift in process Transmission fluid temperature Fire Truck application AND Not Pumping	P2724 P0720 P0721 P0722 P0715 P0716 P0717 P0877 P0878 P0777 P0708 >= 200 RPM >= 200 RPM > -25 deg C	1 second frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Pressure Control Solenoid (PCS) 2 Stuck On	P0777	This test determines if the off-going clutch energized by (PCS2) Pressure Control solenoid 2 remains engaged during a forward range shift.	Accumulated fail timer 1-to-2 upshifts; OR accumulated fail timer for other forward range upshifts; OR accumulated fail timer for forward range closed throttle downshift; OR accumulated fail timer for forward downshifts above closed throttle.	>= 0.2998 seconds >= 0.5 seconds >= 0.5 seconds >= 1.0 second	Not Test Failed This Key On	P2724 P0720 P0721 P0722 P0715 P0716 P0717 P0877 P0878 P0777 P0708	1 second frequency 20 ms	One Trip
					Output Speed	>= 200 RPM		
					Turbine Speed	>= 200 RPM		
			Fail timer accumulates during range to range shifts when attained gear slip speed	<= 25 RPM	Normal powertrain shutdown not in process			
					Normal or Cold powertrain initialization is complete			
					No range switch failure response active			
					No Cold Mode operation			
					No abusive garage shift to 1st range detected			
					Offgoing clutch shift in progress controlled by PCS2			
					Range Shift in process			
					Transmission fluid temperature	> -25 deg C		
					Fire Truck application AND Not Pumping			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	mil Illum
PRNDL/IMS								
Transmission Range Sensor High	P0708	Illegal Range Test This test monitors the transmission range switch for invalid input conditions and parity errors occurring over consecutive ignition cycles.	(No Information): Illegal PRNDL state for a time	>= 1 second	Not Test Failed This Key On Battery Voltage between Engine Speed between for	P0708 9 V and 18 V 200 RPM and 8500 RPM 5 seconds	Case 1: 1 second Case 2: 1.5 seconds frequency 100 ms	One Trip
		Long Term Range Switch Test The PRNDL encoding into the TCM has multiple valid and invalid states. This diagnostic checks the parity of the diagnostic to detect failures in parity over multiple drive cycles	(Long-term Parity): There are 3 counters for long-term parity. These counters are updated at the end of each drive cycle, immediately prior to TCM shutdown. For Counter 1, increment counter IF Parity Error Detected; decrement counter IF No Parity Error Detected AND No Motion Detected. IF Counter 1 THEN report failure.	 >= 15 counts				
			For Counter 2, increment counter IF Parity Error Detected AND (No Valid Drive Detected OR No Valid Park/Neutral Detected) AND Output Speed	 > 200 RPM				
			decrement counter IF No Parity Error Detected AND Valid Park/Neutral Detected AND Valid Drive Detected AND Motion Detected. IF Counter 2 THEN report failure.	 >= 5 counts				
			For Counter 3, increment Counter 3 IF Parity Error Detected while in Reverse AND No Valid Reverse Detected AND Motion Detected.					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
			Decrement Counter 3 IF No Parity Error Detected AND Valid Reverse Detected					
			AND					
			Output Speed	> 200 RPM				
			IF Counter 3	>= 5 counts				
			THEN report failure.					
			Where					
			Parity Error Detected is defined as a failure of the 4-bit PRNDL input such that the sum of those bits yields an odd result for a time;	>= 30 seconds;				
			Motion Detected is defined as output speed	>= 200 RPM				
			for a time;	>= 10 seconds				
			Valid Drive Detected is defined as the 4-bit DL indicates Valid Drive for a time;	>= 3 seconds				
			Valid Park Detected is defined as the 4-bit PRNDL indicates Valid Park for a time	>= 0.2 seconds				
			and output speed;	<= 20 RPM				
			Valid Reverse Detected is defined as the 4-bit PRNDL indicates Valid Reverse					
			for a time;	>= 15 seconds;				
			Valid Neutral Detected is defined as the 4-bit PRNDL indicates Valid Neutral					
			for a time	>= 0.2 seconds				
			and output speed	<= 20 RPM				
			OR for a time.	>= 3 seconds				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Transmission Range Sensor Circuit Performance	P0706	This test monitors the transmission range switch inputs at engine start to determine that it is indicating a valid starting position (Park or Neutral).	For sample size, PRNDL C input is closed OR PRNDL P is NOT closed.	> 11 samples	Not Test Failed This Key On Battery voltage between Powertrain State is Cranking Engine speed	P0706 9V and 18V >= 100 RPM and <= 350 RPM	220 ms frequency 20 ms	Two Trips
Solenoid Electrical								
Main Pressure Modulation Solenoid Control Circuit Open	P0960	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver If hardware indicates open fault for a sample size THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery voltage between If Engine Cranking, then Crank Time AND Battery Voltage High Side Driver 1 Enabled	P0960 P0962 P0657 P0658 P0659 9V and 18V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Main Pressure Modulation Solenoid System Performance	P0961	This test detects unexpected slip events.	When the number of continuous main mod slip events for a range is AND gear slip is indicated A main mod slip event occurs during a forward or reverse range for output speed when Main Mode RVT Min Threshold is	>= 40 >= 100 RPM 55	Not Test Failed This Key On No Fault Pending DTCs for this drive cycle System is not in Initialization, Cold Mode or Shutdown Range Shift is Completed and debounced Output Speed Accelerator Pedal Input is Stable Fire Truck application AND Not Pumping	P0715 P0716 P0717 P0720 P0721 P0722 P0717 P0722 >= 100 RPM	0.8 seconds frequency 20 ms	Two Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Main Pressure Modulation Solenoid Control Circuit Low	P0962	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. If hardware indicates low fault for a sample size THEN report malfunction Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size	 >= 3 samples >= 3 samples	Not Test Failed This Key On Battery voltage between If Engine Cranking, then Crank Time AND Battery Voltage High Side Driver 1 Enabled	P0962 P0960 P0657 P0658 P0659 9V and 18V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip
Main Pressure Modulation Solenoid Control Circuit High	P0963	This test detects solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	>= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P0963 P0657 P0658 P0659 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip
Pressure Control Solenoid (PCS) 2 Control Circuit Open	P0964	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver IF hardware indicates open fault for a sample size THEN report malfunction	 >= 3 samples >= 3 samples	Not Test Failed This Key On Battery voltage between If Engine Cranking, then Crank Time AND Battery Voltage High Side Driver 2 Enabled	P0964 P0966 P2669 P2670 P2671 9V and 18V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Control Solenoid (PCS) 2 Control Circuit Performance	P0965	This test detects the performance of the solenoid by comparing desired current to current as measured by the solenoid control integrated circuit. This test monitors if the low side switching frequencies fall within their desired range, and if they are operating properly per their commanded state.	All Cases				frequency 100 ms	One Trip
			Case 1 (Performance)					
			If abs(Measured current - Commanded current)	>= 100 milliamps	Not Test Failed This Key On	P2671 P2670 P2669 P0964 P0966 P0967	1 sec	
			for a time	>= 1 sec				
			THEN report malfunction					
					No Fault Pending	P0964 P0966 P0967		
					Battery voltage between	9V and 18V		
					If Engine Cranking, then Crank Time	< 4 seconds		
					AND			
					Battery Voltage	> 10 V		
					High Side Driver 2 Enabled			
					Transmission not shifting			
					LU clutch is not engaging or dis-engaging			
					Neutral at Stop is not in process			
			Case 2 (Frequency)					
			If the solenoid is energized and frequency is	< 3000 Hz OR > 5000 Hz	Not Fault Pending	Solenoid Faults (table 1)		
			OR					
			the solenoid is not energized and frequency is	> 3000 Hz	Not Test Failed This Key On	Solenoid Faults (table 1)		
			THEN report malfunction		Not Fault Pending	HSD Faults (table 2)		
					Not Test Failed This Key On	HSD Faults (table 2)		
					Battery voltage between	9V and 18V		
					Lockup Shift Complete	> 0.5 sec		
					Range Shift Complete	> 0.5 sec		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					RELS inactive, RELS override inactive, C2 backfill inactive, Neutral antidrag inactive, Device Control inactive, & EOS inactive	> 0.5 sec		
			Case 3 (Plausibility) |Adler IC commanded - TCM measured duty cycle| for THEN report malfunction	>= 10 >= 1 second	Not Fault Pending Not Test Failed This Key On Not Fault Pending Not Test Failed This Key On Battery voltage between High Side Driver 2 Enabled	Solenoid Faults (table 1) Solenoid Faults (table 1) HSD Faults (table 2) HSD Faults (table 2) 9V and 18V	1 second	
Pressure Control Solenoid (PCS) 2 Control Circuit Low	P0966	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver IF hardware indicates short to ground fault for a sample size THEN report malfunction.	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High Side Driver 2 Enabled	P0966 P0964 P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Control Solenoid (PCS) 2 Control Circuit High	P0967	This test detects solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	 >= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High Side Driver 2 Enabled	P0967 P2669 P2670 P2671 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip
Pressure Control Solenoid (PCS) 1 Control Circuit Open	P2727	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. IF hardware indicates open fault for a sample size THEN report malfunction	 >= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P2727 P2729 P0657 P0658 P0659 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Pressure Control Solenoid (PCS) 1 Control Circuit Performance	P2728	This test detects the performance of the solenoid by comparing desired current to current as measured by the solenoid control integrated circuit. This test monitors if the low side switching frequencies fall within their desired range, and if they are operating properly per their commanded state.	Case 1 (Performance)		Not Test Failed This Key On	P0659	1 sec	One Trip
			If abs(Measured current - Commanded current)	>= 100 milliamps		P0658		
			for a time	>= 1 sec		P0657	frequency 100 ms	
						P2727		
						P2729		
			THEN report malfunction			P2730		
					No Fault Pending	P2727		
						P2729		
						P2730		
					Battery voltage between	9V and 18V		
					If Engine Cranking, then Crank Time	< 4 seconds		
					AND			
					Battery Voltage	> 10 V		
					High Side Driver 1 Enabled			
					Transmission not shifting			
					LU clutch is not engaging or dis-engaging			
					Neutral at Stop is not in process			
			Case 2 (Frequency)					
			If the solenoid is energized and frequency is	< 3000 Hz OR > 5000 Hz	Not Fault Pending	Solenoid Faults (table 1)	frequency 20 ms	
			OR					
			the solenoid is not energized and frequency is	> 3000 Hz	Not Test Failed This Key On	Solenoid Faults (table 1)		
			THEN report malfunction		Not Fault Pending	HSD Faults (table 2)		
					Not Test Failed This Key On	HSD Faults (table 2)		
					Battery voltage between	9V and 18V		
					Lockup Shift Complete	> 0.5 sec		
					Range Shift Complete	> 0.5 sec		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
					RELS inactive, RELS override inactive, C2 backfill inactive, Neutral antidrag inactive, Device Control inactive, & EOS inactive	> 0.5 sec		
			Case 3 (Plausibility) |Adler IC commanded - TCM measured duty cycle| for THEN report malfunction	>= 10 >= 1 second	Not Fault Pending Not Test Failed This Key On Not Fault Pending Not Test Failed This Key On Battery voltage between High Side Driver 1 Enabled	Solenoid Faults (table 1) Solenoid Faults (table 1) HSD Faults (table 2) HSD Faults (table 2) 9V and 18V	1 second frequency 20 ms	
Pressure Control Solenoid (PCS) 1 Control Circuit Low	P2729	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. IF hardware indicates low fault for a sample size THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P2729 P2727 P0657 P0658 P0659 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 m	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Pressure Control Solenoid (PCS) 1 Control Circuit High	P2730	This test detects solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	>= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P2730 P0657 P0658 P0659 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Shift Solenoid 1 Control Circuit Open	P097A	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. If hardware indicates open fault for a sample size THEN report malfunction	 >= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P097A P0973 P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip
Shift Solenoid 1 Control Circuit Low	P0973	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver IF hardware indicates low fault for a sample size THEN report malfunction.	 >= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P0973 P097A P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Shift Solenoid 1 Control Circuit High	P0974	This test detects solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	>= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P0974 P2669 P2670 P2671 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip
Shift Solenoid 2 Control Circuit Open	P097B	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. IF hardware indicates open fault for a sample size THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P097B P0976 P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip
Shift Solenoid 2 Control Circuit Low	P0976	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. IF hardware indicates low fault for a sample size THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P0976 P097B P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Shift Solenoid 2 Control Circuit High	P0977	This test detects solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	>= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P0977 P2669 P2670 P2671 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip
Shift Solenoid 3 Control Circuit Open	P097C	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. IF hardware indicates open fault for a sample size THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P097C P0979 P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip
Shift Solenoid 3 Control Circuit Low	P0979	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF solenoid driver hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver. IF hardware indicates low fault for a sample size THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P0979 P097C P2669 P2670 P2671 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Shift Solenoid 3 Control Circuit High	P0980	This test detects solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	>= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High side driver 2 enabled	P0980 P2669 P2670 P2671 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip
Actuator Supply Circuit Voltage 1 Open (HSD1)	P0657	This test detects if the voltage measured at the HSD1 detection circuit shows that multiple low side detection circuits indicate open, but the high side detection circuit indicates high voltage.	Report malfunction when the number of failure events A failure event occurs when the number of failed solenoids connected to HSD1 AND HSD1 voltage	>= 2 >= 2 >= 6V	Not Test Failed This Key On HSD1 is commanded ON If Engine Cranking, then Crank Time AND Battery Voltage	P0657 < 4 seconds > 10 V	40 ms frequency 20 ms	One Trip
Actuator Supply Circuit Voltage 1 Low(HSD1)	P0658	This test detects low voltage when high voltage is expected indicating a short to ground at the circuit.	Report malfunction when short to ground is detected for a number of events	>= 3 times	Not Test Failed This Key On HSD1 is commanded ON If Engine Cranking, then Crank Time AND Battery Voltage	P0658 < 4 seconds > 10 V	60 ms frequency 20 ms	One Trip
Actuator Supply Circuit Voltage 1 High(HSDI)	P0659	This test detects if the voltage measured at the HSD 1 detection circuit indicates high during initialization (when the circuit is off)	During initialization, report malfunction when the number of failure events A failure event occurs when HSD1 voltage	>= 3 times >= 6V	During initialization		60 ms frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Actuator Supply Circuit Voltage 2 Open (HSD2)	P2669	This test detects if the voltage measured at the HSD2 detection circuit shows that multiple low side detection circuits indicate open, but the high side detection circuit indicates high voltage.	Report malfunction when the number of failure events A failure event occurs when the number of failed solenoids connected to HSD2 AND HSD2 voltage	>= 2 >= 2 >= 6V	Not Test Failed This Key On HSD2 is commanded ON If Engine Cranking, then Crank Time AND Battery Voltage	P2669 < 4 seconds > 10 V	40 ms frequency 20 ms	One Trip
Actuator Supply Circuit Voltage 2 Low (HSD2)	P2670	This test detects low voltage when high voltage is expected indicating a short to ground at the circuit.	Report malfunction when short to ground is detected for a number of events	>= 3 times	Not Test Failed This Key On HSD2 is commanded ON If Engine Cranking, then Crank Time AND Battery Voltage	P2670 < 4 seconds > 10 V	60 ms	One Trip
Actuator Supply Circuit Voltage 2 High (HSD2)	P2671	This test detects if the voltage measured at the HSD 2 detection circuit indicates high during initialization (when the circuit is off)	During initialization, report malfunction when the number of failure events A failure event occurs when HSD2 voltage	>= 3 times >= 6V	During initialization		60 ms frequency 20 ms	One Trip
Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit Open	P2761	This test detects torque converter solenoid electrical open circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a THEN initiate intrusive test by IF hardware indicates open fault for THEN report malfunction	>= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P2761 P2764 P0657 P0658 P0659 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	Two Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit Performance	P2762	This test detects the performance of the solenoid by comparing desired current to current as measured by the solenoid control integrated circuit. This test monitors if the low side switching frequencies fall within their desired range, and if they are operating properly per their commanded state.	Case 1 (Performance) If abs(Measured current - Commanded current) for a time THEN report malfunction	>= 100 milliamps	Not Test Failed This Key On	P0659 P0658 P0657 P2761 P2763 P2764	1 sec frequency 100 ms	One Trip
					No Fault Pending	P2761 P2763 P2764		
					Battery voltage between	9V and 18V		
					If Engine Cranking, then Crank Time AND Battery Voltage	 < 4 seconds > 10 V		
					High Side Driver 1 Enabled			
					Transmission not shifting			
					LU clutch is not engaging or dis-engaging			
					Neutral at Stop is not in process			
			Case 2 (Frequency) If the solenoid is energized and frequency is OR the solenoid is not energized and frequency is THEN report malfunction	 < 3000 Hz OR > 5000 Hz > 3000 Hz	Not Fault Pending	Solenoid Faults	frequency 20 ms	
					Not Test Failed This Key On	Solenoid Faults		
					Not Fault Pending	HSD Faults		
					Not Test Failed This Key On	HSD Faults		
					Battery voltage between	9V and 18V		
					Lockup Shift Complete	> 0.5 sec		
					Range Shift Complete	> 0.5 sec		
					RELS inactive, RELS override inactive, C2 backfill inactive, Neutral antidrag inactive, Device Control inactive, & EOS inactive	> 0.5 sec		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Case 3 (Plausibility) |Adler IC commanded - TCM measured duty cycle| for THEN report malfunction	>= 10 >= 1 second	Not Fault Pending Not Test Failed This Key On Not Fault Pending Not Test Failed This Key On Battery voltage between High Side Driver 1 Enabled	Solenoid Faults (table 1) Solenoid Faults (table 1) HSD Faults (table 2) HSD Faults (table 2) 9V and 18V	1 second frequency 20 ms	
Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit High	P2763	This test detects torque converter solenoid electrical short to power circuit malfunctions.	If hardware fault short to power is present for a sample size THEN report malfunction	>= 3 consecutive samples	Not Test Failed This Key On If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P2763 P0657 P0658 P0659 < 4 seconds > 10 V	60 ms frequency 20 ms	Two Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit Low	P2764	This test detects torque converter solenoid electrical ground circuit malfunctions.	Fault pending is set at single solenoid driver hardware detection of a low fault IF hardware fault is present for a sample size THEN initiate intrusive test by opening low side driver IF intrusive test indicates short to ground exists for a sample size THEN report malfunction	 >= 3 samples >= 3 samples	Not Test Failed This Key On Battery Voltage between If Engine Cranking, then Crank Time AND Battery Voltage High side driver 1 enabled	P2764 P2761 P0657 P0658 P0659 9 V and 18 V < 4 seconds > 10 V	120 ms frequency 20 ms	One Trip
Miscellaneous								
CAN Communication Bus 2 Bus Off	U0074	This test detects if the GMLAN bus is off for a calibration duration.	GMLAN bus is off for a time	>= 3 seconds	Not Test Failed This Key On Ignition Voltage between Battery Voltage between	U0074 9V and 18 V 9 V and 18 V	3 seconds frequency 100 ms	Two Trips
Lost Communication with ECM "A"	U0100	This test detects GMLAN bus failures by detecting the loss of certain message information from the GMLAN Bus.	For all of the signals being monitored on the GMLAN bus, the diagnostic keeps track of the calibration number of timeout, and/or error/invalid states for each message If the number of timeout, and/or error/invalid states Report failure	 > 500 counts out of 600 samples	Ignition Voltage between Battery Voltage between The can bus is active (not failed) Enable criteria must be met for a time	9V and 18 V 9 V and 18 V > 3 seconds	0.5 seconds frequency 10 ms	Two Trips
Sensor Reference Voltage "B" Circuit Fault	P0652	Tests whether the output voltage of the associated 5 Volt (VREF) reference is enabled and within the expected output voltage range. If found to be disabled, attempts are made to re-enable it.	If Power Supply is not enabled OR Voltage OR Voltage for	 > 5.25 V < 4.75 V 2 seconds	Battery Voltage between	9 V and 18 V	2 seconds frequency 50 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium
Brake Switch Circuit	P0703	This test counts how many acceleration events occur while the brake switch input indicates "ON". Failure is reported when the number of events exceeds a calibration value. In some applications, in addition, this test counts how many deceleration events occur while the brake switch input indicates "OFF" and the engine running time while in range. Failure is reported when the number if events exceeds a calibration and the engine running time exceeds a calibration.	case 1 The number of vehicle accelerations with the Neutral at Stop input "ON" case 2 The number of vehicle decelerations with the Neutral at Stop input "Off" and the engine run time > 0 while in range with Neutral at Stop input "off". Time and counts are carried to the next key cycle	>= 3 >= 20	Not Test Failed This Key On Not Test Failed This Key On Not Fault Pending Battery Voltage between Primary Input Speed between for The stuck off section of the test is enabled when Pump mode, Fire Truck pump mode, Direct hold, PTO1, PTO2 are off and NEUTRAL AT STOP: Emissions Credit is enabled.	P0703 P0720 P0721 P0722 P0720 P0721 P0722 9 V and 18 V 200 RPM and 8500 RPM 5 seconds	frequency 150 ms	No MIL
Ignition Switch Run/Start Circuit Low	P2534	This test detects circuit low and open faults associated with the Run/Crank input to the TOM	Run/Crank input is not active for THEN report malfunction	>= 5 sec	Engine Speed for Output Speed	>= 350 rpm >= 2 sec >= 0 rpm	5 sec frequency 100ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Controller Memory								
Internal SPI Diagnostics	P0600	This test detects faults associated with the communication between the microprocessor and the solenoid control integrated circuits internal to the TCM. The diagnostic reads the SPI Range Check Status message as reported by HWIO to determine which devices are being commanded outside of a valid calibration range. The diagnostic reads the SPI Bus Status message as reported by HWIO to determine the validity of SPI data and devices.	If a static bit within SPI messages is not in the proper state for THEN report malfunction	>= 1 sec (in steady state range) OR >= 100 ms (during shift)	Battery voltage between If Engine Cranking, then Crank Time AND Battery Voltage	9V and 18V < 4 seconds > 10 V	1 sec in steady state range OR 100ms during shifts frequency 20 ms	One Trip
Internal Control Module Transmission Range Control Performance	P27B2	This test verifies the transmission is in a valid range by monitoring the states of both the solenoids and pressure switches.	Actual Solenoid or Pressure Switch State for	/= Expected State 1 second	Not Failed This Key On and No Fault Pending Not Failed This Key On and No Fault Pending Not Failed This Key On and No Fault Pending Not Failed This Key On and No	Solenoid Faults (table 1) P0842 P0843 P0847 P0848 P0872 P0873 P0877 P0878 P0751 P0752 P0756 PO757 P0761 P0762 HSD Faults (table 2) P0729	1 second frequency 20 ms	One Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Fault Pending	P0731 P0732 P0733 P0734 P0735 P0736		
					Battery Voltage NOT between	9 V and 18 V		
					Output speed	>50		

Table 1	
Solenoid Faults	P2729, P2730, P2727, P2728
	P0966, P0967, P0964, P0965
	P0973, P0974, P097A
	P0976, P0977, P097B
	P0979, P0980, P097C
	P2764, P2763, P2762, P2761

Table 2	
High Side Driver Faults	P0659, P0658, P0657
	P2671, P2670, P2669