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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		internal combustion engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.				EngineModeNotRunTimer Error		
			Engine Running:		Time between current ignition cycle and the last time the engine was running	>= 28,800.0 seconds	Executed every 100 msec until a pass or fail decision is made	
			If IAT >= OAT: IAT - OAT	> 15.0 deg C	Engine is running			
			If IAT < OAT: OAT - IAT	> 15.0 deg C	Vehicle Speed	>= 12.4 MPH		
			If either of the following conditions are met, this diagnostic will pass:		Engine air flow	>= 10.0 grams/second		
			If IAT >= OAT: IAT - OAT	<= 15.0 deg C	OAT-to-IAT engine running equilibrium counter	>= 300.0 counts		
			If IAT < OAT: OAT - IAT	<= 15.0 deg C	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:	VehicleSpeedSensor_FA IAT_SensorFA		

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				ECT_Sensor_DefaultDetected MAF_SensorFA EngineModeNotRunTimerError		

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Too Low	P0087	Determine if rail pressure is below an absolute value.	Rail pressure	< 0 to 13 MPa (see table **P0087 Minimum rail pressure**)	Run crank voltage Engine running, cranking excluded No IFT running (refer to FUL_IFT_St)	≥ 11.0 V	320 failures out of 457 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Performance (OBD2)	P0089	Determine when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 67 to 217 MPa (see table **P0089 Maximum rail pressure with MU**)	Run crank voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*)	≥ 11.0 V	160 failures out of 229 samples OR 160 continuous failures out of 229 samples 6.25 ms/sample	Type A, 1 Trips

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 Low	P0097	Detects a continuous short to ground in the Intake Air Temperature 2 (IAT2) signal circuit or an IAT2 sensor that is outputting a frequency signal that is too low. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a temperature value. A lower frequency is equivalent to a lower temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	< 13 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 High	P0098	Detects an Intake Air Temperature 2 (IAT2) sensor that is outputting a frequency signal that is too high. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a temperature value. A higher frequency is equivalent to a higher temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	> 390 Hertz (~150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Intermittent In-Range	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 2 readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Multiple Pressure Sensor Correlation Performance (EU Market - 2 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:	> 10.0 [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.
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	**<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	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type A, 1 Trips
			<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	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 Low	P00EA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT 3 Input	< 56.42 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 High	P00EB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT 3 Input	> 151,542 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to ground in the humidity signal circuit or a humidity sensor that is outputting a duty cycle that is too low. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure (MAP) Sensor Performance (US Market - 3 pressure sensor configuration)	P0106	This monitor is used to identify MAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If MAP sensor is not in agreement with the other two the monitor is able to pinpoint MAP as the faulty sensor.	Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 50.00 [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:	> 10.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low (with pull-up)	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 10.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 313.2 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Low	P0112	Detects a continuous short to ground in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too low. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT Input	< 58.00 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too high. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT Input	> 142,438 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150ºC)	< 52 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60ºC)	> 139,500 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -9.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	ECT temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. The calculated high and low limits for the next reading use the following calibrations: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last ECT reading was 90 Deg C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 Deg C and the high limit was calibrated to 200 Deg C the caluculated limits are 101 Deg C and 73 Deg C. The next reading (after the 90 Deg C reading) must be between 73 Deg C and 101 Deg C to be valid. ****************************	7.4 seconds -60.0 Deg C 200.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. **************************** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 19 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 69 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 50 °C when Ambient min is ≤ 10 °C and > -9 °C. Note: Warm up target for range #2 will be at least	See the two tables named: **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary** and **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate** in the Supporting tables section. This diagnostic models the net energy into and out of the cooling	No Active DTC's Engine not run time (soaking time before current trip) Engine run time Fuel Condition Distance traveled *************************** If Engine RPM is continuously greater than for this time period The diagnostic test for this key cycle will abort *************************** *************************** If T-Stat Heater commanded duty cycle for this time period	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA EngineTorqueEstInaccurate ≥ 1,800 seconds 20 ≤ Eng Run Tme ≤ 1,450 seconds Ethanol ≤ 87 % ≥ 0.50 miles *************************** 9,999 rpm 5.0 seconds *************************** *************************** > 20.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			55 °C **************************** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 69 °C when Ambient min is ≤ 52 °C and > 10 °C. == == == == Range #2 (Alternate) ECT reaches 55 °C when Ambient min is ≤ 10 °C and > -9 °C. ****************************	system during the warm-up process. The five energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	The diagnostic test for this key cycle will abort *************************** ECT at start run	*************************** -40 ≤ ECT ≤ 64 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Performance (OBD2, FTS wired to ECM)	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	Averaged for absolute difference between fuel temperature and reference temperature (see **P0181 Fuel Temperature Sensor Reference**)	> 20.0 °C to 20.0 °C (see table **P0181 Fuel Temperature Plausibility**)	Run crank voltage Run crank voltage Engine not cranking A time and is passed since engine movement is detected Engine soak time No error for Engine Not Running timer No DTC active: (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "*OBD Coolant Enable Criteria*" section))	> 6.0 V ≥ 11.0 V > 8 s < 13 s > 28,799 s FTS_FTS_CktFA FTS_PlausRefSnsrFlt > -40 °C = TRUE	45 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Temperature Sensor A Circuit Low	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	< 50 Ω	Run crank voltage Run crank voltage Engine not cranking	> 6.0 V ≥ 11.0 V	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle.	For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ***************************** Type cal above = 0 (non - heated t-stat) == == == == Engine coolant temperature ***************************** Type cal above = 1 (Electrically heated t-stat) == == == == Engine coolant temperature	≤ 68.0 Deg C ≤ 70.5 Deg C	No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature ************************** Engine coolant temperature At least once during the key cycle Type 0 (non-heated t-stat) Type 1 (Electrically heated T-stat) ************************** Heat to coolant DFCO time	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA ≥ 30.0 seconds ≥ 1.2 km ≥ 55.0 kPa ≥ -9.0 Deg C ≥ 69 Deg C ≥ 71.5 to 86.5 Deg C ≥ 20.0 kW ≤ 2.0 seconds	30 failures out of 60 samples 1 sample / second Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Thermostat duty cycle	≤ 20.0 %		
					RPM	≤ 8,192		
					Active Fuel Management is not in	Half Cylinder Mode		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger "A" Overboost Condition	P0234	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent negative control deviation of the boost pressure indicating an overboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the overboost pressure monitor is to detect obstructions in the exhaust pipe. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to an obstruction) that leads to exceed the emission limits.	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) lower than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control active)** [kPa] x **P0234, P2263: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] x **P0234, P2263: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -7.00 [°C] AND < 55.00 [°C] > -18 [kPa/s] AND < 24 [kPa/s]	280 fail counters over 350 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed in range	> 1,800.00 [rpm] AND < 2,550.00 [rpm]		
					Desired intake Boost pressure in range	> **P0234: Minimum boost pressure for overboost monitor enabling** [kPa] AND <**P0234: Maximum boost pressure for overboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60 [°C] ==TRUE < 117 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND < 110 [kPa]		
					Throttle Valve position	>= 100.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger "A" Underboost Condition	P0299	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent positive control deviation of the boost pressure indicating an underboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the underboost pressure monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to a leakage) that leads to exceed the emission	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) higher than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control active)** [kPa] x **P0299, P2263: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control not active)** [kPa] x **P0299, P2263: Underboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -7.00 [°C] AND < 55.00 [°C] > -18 [kPa/s] AND < 24 [kPa/s]	280.00 fail counters over 350.00 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		limits.			Engine speed in range	> 1,250.00 [rpm] AND < 2,000.00 [rpm]		
					Desired intake Boost pressure in range	> **P0299: Minimum boost pressure for underboost monitor enabling** [kPa] AND < **P0299: Maximum boost pressure for underboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 60 [°C] ==TRUE < 117 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND < 110 [kPa]		
					Throttle Valve position	>= 100.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab > **IdleSCD_Decel** AND > **IdleSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **IdleCyl_Decel** AND > **IdleCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution -9 ºC < ECT < 127 ºC < -9 ºC 21 ºC < ECT < 127 ºC 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (4) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 > **IdleSCD_Decel** * **Random_SCD_Decel** > **IdleSCD_Jerk** * **Random_SCD_Jerk** > **SCD_Decel** * **Random_SCD_Decel** > **SCD_Jerk** * **Random_SCD_Jerk** > **IdleCyl_Decel** * **RandomCylModDecel** > **IdleCyl_Jerk** * **RandomCylModJerk**			Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)	> **CylModeDecel * PairCylModeDecel**				
			AND Above TRUE for))	> 35 engine cycles out of 100 engine cycles				
			BANK MISFIRE Cylinders above Bank Thresholds	>= 3 cylinders				
			(Medres_Decel	> **IdleSCD_Decel** * **Bank_SCD_Decel**				
			AND Medres_Jerk)	> **IdleSCD_Jerk** * **Bank_SCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	> **SCD_Jerk * Bank_SCD_Jerk**				
			OR (Lores_Decel	> **IdleCyl_Decel** * **BankCylModeDecel**				
			AND Lores_Jerk)	>**IdleCyl_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) CYLINDER DEACTIVATION MODE (Active Fuel Managment)	> **IdleSCD_Decel * ConsecSCD_Decel** > **IdleSCD_Jerk * ConsecSCD_Jerk** > **SCD_Decel * ConsecSCD_Decel** > **SCD_Jerk * ConsecSCD_Jerk** > **IdleCyl_Decel * ConsecCylModDecel** > **IdleSCD_Jerk * ConsecCylModeJerk** > **CylModeDecel * ConsecCylModDecel** > **CylModeJerk * ConsecCylModeJerk**				

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Misfire Percent Emission Failure Threshold	≥ 4.50 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	 > 8,192 rpm AND > 200 % load AND < 180 counts on one cylinder		
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
					Engine Speed	650 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191) Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except	< **ZeroTorqueEngLoad**	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					CARB approved 3000 rpm to redline triangle.)	or <**ZeroTorqueAFM** if AFM is active in Supporting Tables		
					Below zero torque: TPS Vehicle Speed	≤ 100.0 % (≤ 2.0 % in AFM) > 318 mph (> 318 mph AFM)	4 cycle delay	
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	<**DeacCylInversionDecel** <**DeacCylInversionJerk** > 4 cylinders	0 cycle delay	
					EGR Intrusive test	if Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 98.00 %	7 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTO engaged	Not Enabled	4 cycle delay	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Speed Veh Speed Auto Transmission	> 200 % > 1,000 rpm > 3 mph not shifting		
					indivdual candidate deemed abnormal if number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode	> **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles.			
					abnormal candidates/ total candidates	> 0.50 ratio	discard 100 engine cycle test	
					MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(recognized), or some disturbance like rough road (unrecognized). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:			
					Pattern Recog Enabled	Enabled		
					during Cylinder Deac	Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Disabled		
					Engine Speed	780 < rpm < 6,800		
					Veh Speed	> 0.0 mph		
					The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk)	> Misfire_ decel ***** **1st_FireAftrMisfr_Acel**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						> Misfire_Jerk ***** **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	2 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk ***** **SnapDecayAfterMisfire**		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine			

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	1. Fail counts will occur if the engine goes out synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 2.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 51 > 65	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow insufficient (for OBDII market)	P0401	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower EGR rate causing the vehicle's emissions to exceed the emission limits. The aim of the EGR flow monitor is to detect HP EGR obstructions (insufficient EGR flow). The EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, EGR cooler outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBDII limits.	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant x **P0401: Insufficient EGR flow barometric table B (sea level)** [mg]) + (MidBaro Constant x **P0401: Insufficient EGR flow barometric table B (mid level)** [mg]) + (LoBaro Constant x **P0401: Insufficient EGR flow barometric table B (low level)** [mg]) + (SeaBaro Constant x	Calibration on diagnostic enabling HP EGR control is in closed loop on air flow OR LP EGR (if present) control is in closed loop on air flow OR Diagnostic enabled by calibration when HP/LP EGR control is in closed loop on HP/LP EGR flow Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| for a minimum number of samples	**P0401, P0402: EGR flow monitor enabling** ==TRUE Refer to "Other AICR DSL flags" Free Form 1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0 [%] <= 6 [rpm] > 50 [counts]	240.00 fail counters over 300.00 sample counters sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P0401: Insufficient EGR flow barometric table A (sea level) [mg] x	Fuel request is steady state: |FUEL-FUEL_old|	<= 0.10 [mm^3]		
				P0401: Insufficient EGR flow barometric correction (sea level))	for a minimum number of samples	> 75 [counts]		
				+ (MidBaro Constant x	An air control transition has ended OR Such condition is disabled by calibration	Refer to "Air Control Transition"Free Form OR 1.00 ==TRUE		
				P0401: Insufficient EGR flow barometric table A (mid level) [mg] x	No active transition from a combustion mode to another one	==TRUE		
				P0401: Insufficient EGR flow barometric correction (mid level))	Throttle measured position	> 90.00 [%]		
				+	Outside Air Temperature	> -7.00 [°C]		
				(LoBaro Constant x	Ambient Pressure	> 69.60 [kPa]		
				P0401: Insufficient EGR flow barometric table A (low level) [mg] x	Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 60.00 [°C] ==TRUE		
				P0401: Insufficient EGR flow barometric correction (low level))	Desired EGR flow	> **P0401: Minimum desired EGR flow** [mg]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Desired fuel quantity Engine speed No faults on proper temperature sensor All enabling conditions last for a time	> 25.00 [mm^3] AND < 43.00 [mm^3] > 1,800.00 [rpm] AND < 2,400.00 [rpm] AIC_EGR_FlowDiagAirTempFA ==FALSE > 1.00 [s]		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt Low	P040C	Diagnose the EGR Down Stream Temperature sensor circuit low if the feedback of the Down Stream temp sensor is below allowed operating range the sensor is faulted.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 390.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor2 Ckt High	P040D	Diagnose the EGR Down Stream Temperature sensor circuit high if the feedback of the Down Stream temp sensor is above allowed operating range the sensor is faulted	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 1,460.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature 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 > 60.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Range/ Performance	P041B	Determines the EGR temperature Sensor 1 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Up Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **UP Stream Stk Temp Vrtn**	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 Sec P262B Active	cumulative EGR Flow > 1,000.00 decigrams or [x 1/10 gram] 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Low	P041C	Diagnose the EGR Up Stream Temperature sensor circuit low by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is below the allowed operating range, the sensor is out of range low.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 145.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt High	P041D	Diagnose the EGR Up Stream Temperature sensor circuit high by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is above the allowed operating range, the sensor is out of range high.	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 825.00 Ω impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Temperature Sensor1 Ckt Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 50.00 Ω impedance	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	40 failures out of 50 samples 100 ms /sample, continuous	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Catalyst up exhaust temperature (by sensor) lower than calibration; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND	Amb Temp > 266.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 255.99 [°C] AND Cat Up Temp Snsr < 1,500.00 [K]; VeCATD_e_CatSt = TeCATR_e_CatMontrSt.CeCATD_e_MontrEnbl [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND	Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Rapid Response (RR) (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCatEff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 1 trip (with no mulfunction) to report pass	

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if:	[Enumerative]		
					- DPF regeneration enabled	DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative]		
					AND - Injection system not in fault (Fault Flag = FALSE)	AND Injection System Flt = NOT (FUL_GenericInjSysFlt)		
					AND - Ambient temperature information not in fault (Fault Active = FALSE)	AND Amb Temp FA = NOT (CAT_OutsideTempFA)		
					AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE)	AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt)		
					AND - Ambient pressure higher than calibration	AND Amb Press > 70.00 [KPa]		
					AND - Ambient temperature higher than calibration	AND Amb Temp > 266.00 [K]		
					AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run	AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Main Catalyst Efficiency Below Threshold Bank 1	P0422	The Second Catalyst (UF DOC) monitor only runs during DPF regeneration and compares the UF DOC released oxidation heat and the exhaust-injected fuel quantity (by HCI) both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Second Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail cause the Second Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that exhaust-injection (by HCI) is enabled during UF DOC monitor in order to produce enough exothermic heat across the Second Catalyst to evaluate the component conversion efficiency in a reliable way.	Second Catalyst Aging Index < Threshold If - Second Catalyst EWMA filter enabling calibration = TRUE AND - Second Catalyst conversion inefficiency previously detected (Second Catalyst Fault Active = TRUE) Then: Second Catalyst Aging Index < Threshold	Aging Index < **Cat2_CrtdEffThrsh** [Curve] If EWMA Enbl Cal = 0.00 [Boolean] AND Second Catalyst FA = CAT_Cat2_SysEffLoB1_FA Then: Aging Index < **Cat2CrtdEffRepEWMA** [Curve]	- Second Catalyst monitor enabling calibration = TRUE AND No active DTCs: - Second Catalyst up temperature estimation not in fault (Fault Flag = FALSE) AND - Second Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; Second Catalyst monitor status is DISABLED if: - DPF regeneration disabled OR - HCI system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Second Catalyst up exhaust flow estimation in	Monitor Enbl Cal = 1.00 [Boolean] AND Cat2 Up Temp Estim Flt = NOT (EGT_TempCat2_UpFlt) AND Cat2 Dwn Temp Snsr Flt = NOT (EGT_SnsrCat2_DwnFlt); Samples nr. = 10.00 [Counter]; VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrDsbld [Enumerative] DPF_DPF_St = TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] OR HCI System Flt = HCI_GenericShtOffReq OR Amb Temp FA = CAT_OutsideTempFA OR Cat2 Up Exh Flow Flt = EXF_TotExhCat2_UpFlt	Task Time = 100 [ms] If - Second Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 0.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) Then: 1 trip (with malfunction) to set DTC (Type A)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Second Catalyst (UF DOC) monitor. In MY17 sw the mentioned monitor only runs in the following below exhaust configuration: - C_UI_SCR_HCI_C_DPF: Close Coupled DOC (Catalyst) --> Urea Injector --> Selective Catalyst Reduction --> Hydro Carbon Injector --> Under Floor DOC (Second Catalyst) --> Diesel Particulate Filter			fault (Fault Flag = TRUE) OR - Ambient pressure lower than calibration OR - Ambient temperature lower than calibration OR - Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; Second Catalyst monitor status can move from DISABLED to TRIGGERED if: - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient pressure higher	OR Amb Press < 70.00 [KPa] OR Amb Temp < 266.00 [K] OR Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean]; VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrTrg [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] AND HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Amb Press > 70.00 [KPa]	If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					than calibration AND - Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Second Catalyst up exhaust temperature (by estimation) lower than calibration; Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if: - DPF regeneration enabled AND	AND Amb Temp > 266.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 255.99 [°C] AND Cat2 Up Temp Estim < 1,500.00 [K]; VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrEnbl [Enumerative] DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] AND	Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard) If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Rapid Response (RR) (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Sta	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient pressure higher than calibration AND - Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Second Catalyst up exhaust temperature (by estimation) higher than calibration AND - Exhaust injection (by HCI) enabled AND - Second Catalyst up exhaust flow estimation higher than calibration AND - Exhaust injection fuel quantity (by HCI) higher than calibration;	HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Amb Press > 70.00 [KPa] AND Amb Temp > 266.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat2 Up Temp Estim > 0.00 [K] AND HCI_InjReleaseSt = TRUE [Boolean] AND Cat2 Up Exh Flow > 0.00 [g/s] AND Exh Inj Fuel Qnty (by HCI) > 0.00 [g];	ndard) - 1 trip (with no mulfunction) to report pass - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard (NeCATD_e_EWMA_CalcStatCat2_Eff = TeCATR_e_Status_EWMA.CeCATR_e_EWMA_Standard)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if: - Engine not running (to defreeze Engine running) OR - Second Catalyst up exhaust flow estimation lower than calibration (to defreeze Second Catalyst up exhaust flow estimation higher than second calibration) OR - Exhaust injection fuel quantity (by HCI) lower than calibration (to defreeze Exhaust injection fuel quantity (by HCI) higher than calibration); Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Second Catalyst	Engine not running [Boolean] (Engine running [Boolean]) OR Cat2 Up Exh Flow < 0.00 [g/s] (Cat2 Up Exh Flow > 0.00 [g/s]) OR Exh Inj Fuel Qnty (by HCI) < 0.00 [g] (Exh Inj Fuel Qnty (by HCI) > 0.00 [g]); VeCATD_e_Cat2_St = TeCATR_e_CatMontrSt.CeCATD_e_MontrDone [Enumerative]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND - Ambient pressure higher than calibration AND - Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Integrated exhaust injected fuel quantity (by HCI) higher than curve.	DPF_DPF_St ≠ TeDPFR_e_DPF_St.CeDPFR_e_SootLoading [Enumerative] AND HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Amb Press > 70.00 [KPa] AND Amb Temp > 266.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Exh Inj Fuel Qnty (by HCI) > **Cat2_CrtdMaxFuel** [g].		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance [use with a single fuel tank]	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta fuel volume change over 38.2 liters of fuel consumed by the engine.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 % or 117.30 liters			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out of range high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 % or 6.41 liters			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Open (Output Driver Monitor) (Non- EREV)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0691 may also set (Fan 1 Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan System Performance [Electro-Viscous Engine-Driven]	P0483	Detects inability to control fan speed to desired RPM	Weighted filtered Cooling Fan Speed Differential [Measured - Commanded]	1. <= -500.00 RPM OR 2. >= 500.00 RPM	1. System Performance Test Triggered [FEAD_b_SysPerfTestTrig] 2. Commanded Cooling Fan Output Duty Cycle [FEAR_Pct_PWM_Output DutyCycle] 3a. Intake Air Temp Sensor Fault Active [DTCs P0112, P0113, P1111, P1112] 3b. Engine Coolant Temp Sensor FA [DTCs P0116, P0117, P0118, P0119, P1114, P1115] 3c. Cooling Fan Speed Sensor Circuit FA [DTC P0526] 3d. Cooling Fan FOD_OutputDriver_FA 3e. Ignition Sw Position Run_Crank Circuit voltage 3f. Induction Air Temp 4. System Performance Test enabled 5. Fan Speed Total Weighting Filtered Factor Calculation [See Supporting Calculation and Tables]	1. == TRUE 2. >= 5.00 % 3a. <> TRUE 3b. <> TRUE 3c. <> TRUE 3d. <> TRUE 3e. >= 11.00 volts 3f. >= -20.00 degC 4. == TRUE 5. > 0.60 [dimensionless]	Fail condtion present >= 600.00 ; 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Speed High [Electro-Viscous Engine-Driven]	P0495	Diagnoses the engine-driven cooling fan speed during OFF state against a rational speed accounting for inertia and ram-air flow effects	Measured Cooling Fan Speed	> Calculated Allowed Fan Drag Speed RPM	a) Diagnostic enabled b) Hydraulic Fan Clutch Pumped Out [FEAD_b_ClutchPumpedOut] c) Calculated Cooling Fan Speed [FEAD_n_FanDriveSpeed]	a) == TRUE b) == TRUE c) > 1,500.00 RPM	800.00 failures / 1,000.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 75.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00175	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (120 °C) Must verify KfECTI_T_EngCoolHotLoThresh (118) is less than KfECTI_T_EngCoolHotHiThresh (120)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.2 mph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 12.00 pct < 75.00 pct		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -150.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00175	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (120 °C) Must verify KfECTI_T_EngCoolHotLoThresh (118) is less than KfECTI_T_EngCoolHotHiThresh (120)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.2 mph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position	> 12.00 pct		
					or Clutch Pedal Position	< 75.00 pct		

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Speed Sensor Circuit [Electro-Viscous Engine-Driven]	P0526	Diagnoses the engine driven cooling fan speed sensor	Measured Cooling Fan Speed	< 4.00 RPM	a) Commanded Fan Output Duty Cycle [FEAR_Pct_PWM_OutputDutyCycle] b) Diagnostic enabled c) Timer - Test Enable	a) >= 36.00 % b) == TRUE c) >= 2.00 seconds	900.00 failures / 1,200.00 samples 100 ms / sample	Type B, 2 Trips

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585 - 0.615 0.78 - 0.81, 1.005 - 1.035	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS, "Emissions Neutral Diagnostics – special type C"

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	.Brake pedal position sensor movement diagnostic cal is enabled 1.00	True	Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 2.60 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "open short to ground when the ratio is measured in the following rangs: 0 - 0.185	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit	Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005 - 1.035	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	
				In all cases, the failure count is cleared when controller shuts down				

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECM Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.46250 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 6.41 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 159 / 399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow since last powerup reset >=	3		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Open	P0627	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground.	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 0 RPM	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 0 RPM	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit High Voltage	P0629	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Detects an inoperative malfunction indicator lamp control low side driver circuit. This diagnostic reports the DTC when an open circuit is detected.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controlle rs P263A may also set (MIL Control Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 >	4.875 % Vref2 5.125 % Vref2 0.0495 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Shared High Side Drive #1 Control Circuit Low (STG) - (GEN III Controllers ONLY)	P0658	Controller specific output driver circuit diagnoses the shared high sided driver # 1 for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	- Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. - Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between output and controller ground	Shared high side drive #1 low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 6.00 = ON	20 failures out of 25 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Shared High Side Drive #1 Control Circuit High (STP) - (GEN III Controllers ONLY)	P0659	Controller specific output driver circuit diagnoses the shared high sided driver # 1 for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	- Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. - Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between output and controller power	Shared high side drive #1 diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 6.00 = ON	20 failures out of 25 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Open	P0685	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 K Ω ohms impedance between output and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Control module relay feedback circuit low voltage	Powertrain relay voltage <= 5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, No SVS

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Low Voltage (ODM)	P0691	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or too high or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref3 < or ECM percent Vref3 > or the difference between ECM filtered percent Vref3 and percent Vref3 >	4.875 % Vref3 5.125 % Vref3 0.0495 % Vref3	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref4 < or ECM percent Vref4 > or the difference between ECM filtered percent Vref4 and percent Vref4 >	4.875 % Vref4 5.125 % Vref4 0.0495 % Vref4	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($1C7/$1C9 for engine torque, $1CA/$1C6 for axle torque)	Message <> 2's complement of message	Serial communication to EBTCM (U0108)	No loss of communication	>= 8 failures out of 10 Performed on every received message	Type C, No SVS Safety Special Type C
					Power Mode Engine Running	= Run = True		
					Status of traction in GMLAN message ($4E9)	= Traction Present		
			OR Serial Communication message ($1C7/$1C9 for engine torque, $1CA/ $1C6 for axle torque) rolling count index value	Message rolling count value <> previous message rolling count value plus one			8 rolling count failures out of 10 samples Performed on every received message	
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 5 multi-transitions out of 5 samples. Performed every 200 ms	
			Torque request greater than torque request diagnostic maximum threshold	> 0 Nm for engine torque based traction torque system, OR > 0 Nm for axle torque based traction torque system			>= 4 out of 10 samples Performed on every received message	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor/ Switch Communication Circuit A Low	P1015	This monitor checks if the Reductant Control Module SENT Sensor protocol is out of range low	The SENT Message Rolling Pulse Count is provided to the ECM by the DEF-C via CAN bus. This monitor detects a Low Circuit Fault in the SENT Communication Circuit.	SENT Message Rolling Pulse Count sample equals to the previous sample AND Sent Circuit Low Error Message equals to TRUE	Engine in Cranking Phase Run/Crank is Active Powertrain relay voltage No loss of CAN communication DEF-C Controller not in initialization condition	FALSE TRUE > 11.00 V CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE	Time counter: 50.00 fails out of 62.00 samples Task = 100ms	Type A, 1 Trips

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor Not Plausible	P111E	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTR_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_IAT_Snsr **Sensor3 =** CeECTR_e_OAT_Snsr =================== A failure will be reported if any of the following occur: 1) Sensor1 power up absolute temp difference to Sensor2 and Sensor3 is (Sensor1 fast fail) . 2) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: (and a block heater has not been detected) 3) Sensor1 power up temp is lower than Sensor2 and Sensor3 by this amount: 4) Sensor1 power up temp is ≥ Sensor2 and	≥ 60.0 ºC ≥ 20.0 and < 60.0 ºC ≤ 20.0 Deg ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag ================== Block Heater detection is **enabled** when either of the following occurs: 1) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: 2) Cranking time ================== Block Heater is **detected**	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 28,800 seconds > 25,200 seconds = Not occurred = False = False = False ≥ -9 ºC = False ================== ≥ 20.0 ºC and < 60.0 ºC < 14.0 Seconds ==================	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sensor3 by 20.0 ºC and the time spent cranking the engine without starting is ≥ 14.0 seconds with the LowFuelConditionDiag	= False	and diagnostic is aborted when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints 1b) Drive time 1c) Vehicle speed 1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows: 1e) IAT drops from power up IAT 2a) ECT monitoring is enabled after engine start in the following engine run time window 2b) Sensor1 temp derivative during the test is: 2c) Consectutive samples of 2b) being true are: ================== Diagnostic is **aborted** when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Engine off time (i.e. auto stop) during Block heater detection	> 400 Seconds with > 14.9 MPH and 1.00 times the seconds with vehicle speed below 1b ≥ 8.0 ºC 1.0 <= seconds <= 40.0 < -0.10 ºC/sec ≥ 4 samples =================== ≥ 1,800 Seconds ≥ 300.0 Seconds		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Run/ Start Voltage Signal Message Counter Incorrect	P130F	This DTC monitors for an error in the Ignition Run/Start Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding EGR valves, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the EGR flow response time.	Error difference (absolute value) between the desired EGR rate and the actual EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140B: Increasing EGR slow response threshold** [%]	Calibration on diagnostic enabling	**P140B, P140C: EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples >= 200.00 sampling time is 25ms	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 10.00 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					OBD Coolant Enable Criteria	==TRUE		
					Throttle measured position	> 90.00 [%]		
					Outside air temperature	> -7.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 74.80 [kPa]		
					Engine speed in range	> 1,500.00 [rpm] AND < 3,000.00 [rpm]		
					Desired fuel quantity in range	> 30.00 [mm^3] AND < 50.00 [mm^3]		
					Exhaust manifold pressure in range	> 100.00 [kPa] AND < 250.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> -70.00 [mg/s] AND < -10.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	< 0 [mg]		
					EGR valve position OR it is above that threshold for a time	<= 70.00 [%] >= 0.00 [s]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal EGR valve total			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the EGR system that lead to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding EGR valves, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the EGR flow response time.	Error difference (absolute value) between the desired EGR rate and the actual EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140C: Decreasing EGR slow response threshold** [%]	Calibration on diagnostic enabling	**P140B, P140C: EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>= 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	> 10.00 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					OBD Coolant Enable Criteria	==TRUE		
					Throttle measured position	> 90.00 [%]		
					Outside air temperature	> -7.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ambient air pressure	> 74.80 [kPa]		
					Engine speed in range	> 1,500.00 [rpm] AND < 3,000.00 [rpm]		
					Desired fuel quantity in range	> 10.00 [mm^3] AND < 50.00 [mm^3]		
					Exhaust manifold pressure in range	> 100.00 [kPa] AND < 250.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	> 10.00 [mg/s] AND < 70.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	> 0 [mg]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request signal in $19D	Communication of the Alive Rolling Count or Protection Value in the Transmission Engine Speed signal over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 25ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undertermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 0.5 seconds			fail continuously for greater than 0.5 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Pressure Regulator 1 Control Performance	P163A	Determine when commanded current for Fuel metering Unit valve is out of expected current range.	Current flowing through fuel metering unit valve OR Current flowing through fuel metering unit valve	> 2.80 A < 0.05 A	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_MU_DrvrCloseTFTKO FHP_MU_DrvrOpenTFTKO	160 failures out of 250 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Pressure Regulator 2 Control Performance	P163B	Determine when commanded current for Rail Pressure Regulator valve is out of expected current range.	Current flowing through pressure regulator valve OR Current flowing through pressure regulator valve	> 2.80 A < 0.05 A	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl*) No active DTC since key is on:	≥ 11.0 V FHP_PR_DrvrCloseTFTKO FHP_PR_DrvrOpenTFTKO	160 failures out of 250 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Voltage Signal Message Counter Incorrect	P167F	This DTC monitors for an error in the FTZM Battery Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough.	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	> 5.50 Volts > 5.50 Volts	240 / 480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation #2	P16A7	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage #2. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough. Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2.	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 5.50 Volts > 5.50 Volts	240 / 480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	39 / 399 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	159 / 399 counts continuous; 12.5 ms /count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance (Diesel)	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 3,800.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 3,800.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 20 counts; 25.0msec/count	
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 450 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 450 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	
			TOS to wheel speed conversion factor is out of bounds given by threshold	N/A	Ignition State	Accessory, run or crank Transfer case range valid	7.00 / 10.00 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range Transfer case neutral request from four wheel drive logic does not match with operating conditions			and not over-ridden FWD Apps only		
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 220.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request	4,096.00	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Without Motor is greater than its redundant calculation plus threshold	Nm			2,048 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	219.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 150 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, down time multipier 0.5	

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 2,048 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

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	220.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 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 150 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 150 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	**P16F3_Speed Control External Load f(Oil Temp, RPM)** + 220.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	**P16F3_Speed Control External Load f(Oil Temp, RPM)** + 220.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	3,800.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus	3,800.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold				0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	3,800.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	142.50 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	219.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	550.50 m/s	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 150 ms continuous, 0.5 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 2,048 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 325 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold	High Threshold 220.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range	Low Threshold - 220.00 Nm			down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 65.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 220.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Torque Closed Loop Fuel Quantity Correction higher then threshold OR Engine Torque Closed Loop Fuel Quantity Correction lower then threshold	20.22 mm3 - 20.22 mm3	Engine cranking or engine running		Up/down timer 450 ms continuous, 0.5 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	1. 219.00 Nm 2. N/A 3. 219.00 Nm 4. 219.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 220.00 Nm 3. & 4.:	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold			Accessory, run or crank		
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	3,800.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	142.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	3,800.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	5,700.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AC friction torque is greater than commanded by AC control software	65.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	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, 0.5 down time multipier	
			Requested fuel mass is greater or equal to its redundant calculation plus	33.77 mg	Engine running No rich combustion mode		Up/down timer 450.00 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold		No cranking phase No fuel cut off request		0.5 down time multiplier	
			Engine friction torque is greater than its redundant calculation plus threshold OR Engine friction torque is lower than its redundant calculation minus threshold	220.00 Nm 220.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			High Pressure Pump Torque Load is greater than threshold OR High Pressure Pump Torque Load is lower than threshold	220.00 Nm 0.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Pumping Losses is lower than threshold OR Pumping Losses rate of change signal greater than P2D2 threshold	0.00 Nm 13.75 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Start Up Engine Friction Compensation greater than threshold OR Start Up Engine Friction Compensation lower than	220.00 Nm 0.00 Nm	Engine running		Up/down timer 137.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold					
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	220.00 Nm	Engine running		Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Active damping torque reduction greater than threshold OR Active damping torque reduction lower than threshold	220.00 Nm -220.00 Nm	Engine running		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	
			Fuel volume request greater than its redundant calculation plus threshold	40.45 mm3	Engine running No rich combustion mode		Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Absolute value of the sum of the Fuel Volumes in the pulse train minus Fuel Volume Request minus Main Correction greater than threshold	40.45 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 150.00 ms continuous, 0.5 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	319.18 us additional value for emission tests: 0.00 us	Engine running		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			the threshold is incremented by a further value)	additional value fro CSERS test 0.00 us				
			Cumulative Desired Energizing Time greater than its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	319.18 us additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us	Engine Running		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	
			Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal higher than threshold OR Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal lower than threshold	300.00 MPa -40.00 MPa	Engine running Delta Filtered Pressure value lower than AND Delta Filtered Pressure value greater than	 2,300.00 MPa/s -2,200.00 MPa/s	Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Absolute difference between Main Correction and its redundant calculation greater than or equal to threshold	40.45 mm3	Engine running No rich combustion mode		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than its redundant calculation plus threshold OR (only if cylinder balancing detected a fault) Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than threshold	**P16F3_CB safety deadband threshold f (Fuel Rail Pressure)** us **P16F3_CB safety deadband threshold f (Fuel Rail Pressure)** us	Engine running		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	**P16F3_EIA safety deadband threshold f (Fuel Rail Pressure)** us	Engine cranking or engine running		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	40.45 mm3	Engine cranking or engine running		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	
			Absolute value of the weighted delta energizing time greater then threshold	**P16F3_SQA safety deadband threshold f (Fuel Rail Pressure)** us	Ignition State	Accessory, run or crank	Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Oil Pump Low Pressure Offset Friction greater then zero OR		Engine running		Up/down timer 475.00 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Oil Pump Low Pressure Offset Friction lower then threshold	-3.00 Nm			multiplier	
			Absolute value of fuel mass compensated for coolant temperature greater then threshold	16.89 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Absolute value of fuel mass compensated for air temperature greater then threshold	16.89 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Difference between Energizing Time Compensation for Temperature Specific Current (TSC) and its redundant calculation greater then threshold	**P16F3_TSC safety deadband threshold f (Fuel Rail Pressure)** us	Engine Running AND Engine State is Syncronous		Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Absolute value of Main correction compensation based on coolant temperature greater then threshold	20.22 mm3	Engine Running No rich combustion mode		Up/down timer 150.00 ms continuous, 0.5 down time multiplier	
			Rail Pressure Wave Compensation greater than threshold	**P16F3_Rail Pressure Wave Compensation f(Fuel Rail Pressure, Fuel Quantity)** MPa	Engine cranking or running		Up/down timer 450.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 450.00 ms continuous, 0.5 down time multiplier	
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	220.00 Nm	Engine running		Up/down timer 450.00 ms continuous, 0.5 down time multiplier	
			Fuel Temperature Energizing Time Compensation greater then its redundant calculation plus threshold	**P16F3_FTD safety deadband threshold f (Fuel Rail Pressure)** us	(Engine running OR engine cranking occurred in current driving cycle) AND FUL_InjLeakTempValid	 = TRUE	Up/down timer 137.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the diffence between current and previous Fuel Injector Backflow Temperature greater then threshold	10.00 °C/100ms	Engine cranking or engine running ECT_Sensor_FA AND FTS_FTS_CktFA AND FTS_FTS_PlFA	 = FALSE = FALSE = FALSE	Up/down timer 137.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND XOY_SecurityFlt_CeXOYR_e_FULR_FTD_RateLimFlt AND XOY_SecurityFlt_CeXOYR_e_ETMR_FTD_RedntCalcFlt	 = FALSE = FALSE		
			Increase of pumping losses due to exhaust brake actuation less then threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Exhaust Brake Torque Capacity less then Threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Delta Engine Fuel Temperature less than zero		Engine Fuel Temperature below threshold Engine cranking or engine running	80.00 ° C	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR		Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Previous Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Combustion Mode Arbitration Winner is equal to Previous Combustion Mode Arbitration Winner and not equal to Normal combustion Mode					
			The sum of Low, Middle and High Barometric Correction Factors greater than 1		Engine cranking or engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Performance	P206B	This diagnosis checks if the DEF Quality Sensor has performance problems	The Quality sensor ready flag is provided to the ECM by the DEF-C via CAN bus. This monitor checks if the reflected sound waves are not heard by the sensor (for example, if the sensor is contaminated).	Quality sensor ready flag status equals to FALSE	Run/Crank is Active	TRUE	Time counter: 3,000.00 fails out of 3,750.00 samples Task = 100ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					Engine in Cranking Phase	FALSE		
					No loss of CAN communication	CAN_LostComm_FltN_BusB_DEF_C == FALSE		
					No fault messages from the DEF-C Controller	TRUE		
					DEF Level Estimation	> 7.50 l		
					DEF QS thermistor temperature	> 5.00 °C		
					No electrical fault on DEF QS is present	DQMR_DEFQS_ElecFlt == FALSE		
					No electrical low fault on DEF Quality Sensor SENT circuit	DQMR_DEFQS_SENT_ElecFA == FALSE		
					No performance fault on DEF Quality Sensor SENT circuit	DQMR_DEFQS_SENT_PerfFA == FALSE		
					No fault on DEF QS thermistor is present	DQMR_DEFQS_TempFlt == FALSE		
					No electrical fault on Quality sensor PZT is present	DQMR_DEFQS_PZT_ElecFlt == FALSE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SCR NOx Catalyst Efficiency Below Threshold Bank 1	P20EE	This diagnosis checks if there is a malfunctioning in the SCR conversion system through its SCR NOx Conversion Efficiency. SCR conversion efficiency is evalueted by two NOx Sensors (Upstrem & Downstrem SCR). Monitoring is executed by compararing a mesured NOx efficiency and expected conversion efficiency: - Measured Efficiency is calculated as η_Eff_Msrd = 1 - [∫ NOx_Dwn_Msrd / ∫ NOx_Up_Msrd] - Expected Efficiency is evalueted as η_Eff_Ref = 1 - [∫ NOx_Dwn_Ref / ∫ NOx_Up_Msrd]	- If EWMA feature is not enable (1 == 0 [Boolean]), SCR measured NOx conversion efficiency (η_Eff_Msrd) lower than expected one (η_Eff_Ref) - If EWMA feature is enable (1 == 1 [Boolean]), EWMA filtering is apply to the difference between SCR measured NOx conversion efficiency (η_Eff_Msrd) and expected one(η_Eff_Ref)	- If EWMA filter is not enable (1 == 0 [Boolean]) --> η_Eff_Ref - If EWMA filter is enable (1 == 1 [Boolean]) --> Fail Threshold is = 0, Repass Threshold is = 0	Test enabled by calibration; No active DTCs; Debounce time has to be elapsed after SCR Chemical Model is healed; Debounce time has to be elapsed after exiting from Transient Dosing forced by Remedial Action (conditions active only if Market ≠ USA_CARB) Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is enabled and in Rapid Response (RR) or Fast Initial Response (FIR) status;	CalOut = 1 [Boolean]; ≠ NOX_Snsr1_NOx_Flt ≠ NOX_NOx_SnsrSCR_DwnFlt ≠ EGT_TempSCR_UpFlt ≠ EGP_PresSCR_UpFlt ≠ EXM_TurbFlowNotValid ≠ SCR_RDP_Flt ≠ SCR_TipStuckFltSt ≠ SCR_ChemicalMdlFlt; Debounce = 300 [sec]; Debounce = 300 [sec]; NotDsbl = True [Boolean]; NotRun = True [Boolean];	One failure to set the DTC	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Test per trip up to calibrateable value when EWMA filter is active and in Fast Initail Response (FIR) status;	FIR Test Trip < 1 ;		
					Total Test executed in Rapid Response Fast Initail Response (FIR) up to calibrateable value when EWMA filtering is active	FIR Tot Test < 2 ;		
					Test per trip up to calibrateable value when EWMA filter is active and in Rapid Response (RR) status;	RR Test Trip < 6 ;		
					Total Test executed in Rapid Response (RR) up to calibrateable value when EWMA filtering is active;	RR Tot Test < 6 ;		
					DEF system ready to inject;	DEF Ready = True [Boolean];		
					Urea inside the Tank not frozen;	DEF Tank Status = DEF_TankNotFrozen [Enumerative];		
					Debounce time has to be elapsed after DEF Defrost has been complited ;	Debounce = 300 [sec];		
					Engine Torque request higher than calibration;	Torque >= 65 [Nm];		
					Upstream SCR NOx Sensor measurement	Reliable = True [Boolean];		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					becomes true; Difference between SCR upstream and SCR downstream temperatures has to be: - higher than first calibration curve (f[SCR mean Temperature]) AND - lower than second calibration curve (f[SCR mean Temperature]); Debounce time has to be elapsed when difference between SCR upstream and SCR downstream temperatures condition becomes in range Exhaust mass flow and SCR average temperature shall be within calibrateable region defined by 2 size table (f [Exhaust mass flow, SCR average Temperature]), enablement occur if table output is greater than calibration; Debounce time has to be elapsed when exhaust mass flow and SCR average temperature condition becomes in range;	SCR Up/Down Diff Temperature > **T_MinTempGrad** [°C] Temperature < **T_MaxTempGrad** [°C]; Debounce = 15 [sec]; **K_EffExhFlowCond** > 1 [-]; Debounce = 30 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR mean Temperature time derivative is inside a region defined by maximum and minimum calibrations and debounce time has been elapsed base on following logic: - while SCR mean Temperature time derivative is out of the region, the system continuously evaluete the debounce time base on calibration curve (f[SCR mean Temperature time derivative]) and record the maximum value; - instead when SCR mean Temperature time derivative enter inside region, countdown start until debounce time has been reached; Upstream SCR NOx flow measurement lower than calibration and debounce time has been elapsed base on following logic: - while SCR NOx flow measurement higher than calibration, the system continuously evaluete the NOx avarage flow; - instead when SCR NOx flow measurement becomes lower than calibration, debounce time base on calibration curve	-5 < Delta Temperature < 5 [°C/sec]; Debounce = **t_DerTempDsblTmr** [sec]; NOx Up Flow < 75 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max Debounce = 5 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(f[NOx avarage flow, time spent with NOx flow higher than calibration]) is evalueted and countdown start until debounce time has been elapsed. Limitation on the debouce time is always applied;			
					Upstream SCR NOx flow measurement higher than calibration;	NOx Up Flow > 7 [mg/s];		
					Upstream SCR NOx Sensor measurement higher than calibration;	NOx Up > 100 [ppm];		
					Upstream SCR NOx Sensor measurement lower than calibration;	NOx Up < 500 [ppm];		
					Downstream SCR NOx Sensor measurement higher than calibration;	NOx Dwn > -1 [ppm];		
					Upstream SCR NOx flow measurement lower than calibration;	NOx Up Flow < 75 [mg/s];		
					Upstream SCR absolute NOx derivative flow lower than calibration;	Delta NOx Up Flow < 35 [mg/sec^2];		
					NO2/NO ratio shall be: - higher than first calibrateable value AND - lower than second calibrateable value;	NO2/NO > 0 [-] NO2/NO < 1 [-];		
					Debounce time has to be elapsed when all NOx	Debounce = 0 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					conditions (except Upstream SCR NOx flow measurement lower than calibration) becomes true; Slip conditions: - debounce time has to be elapsed when slip goes off, OR - when slip is active NOx Upstream flow accumulated shall be greater than a calibration curve (f[SCR Temperature]); No DPF / DeHC combustion modes has to be active; Debounce time has to be elapsed after exiting from a DPF / DeHC combustion modes; NH3 storage deviation error has to be: - higher than first calibration curve (f[SCR Average Temperature]) AND - lower than second calibration curve (f[SCR Average Temperature]);	Debounce = 30 [sec] ∫ NOx_Up > **m_SlipNOxIntglThrsh** [mg]; Cmb ≠ DPF_HiO2 | DPF_LoO2 | DPF_EngPrtct_HiO2 | DPF_EngPrtct_LoO2 | DPF_PN | DPF_RichIdle | DeHC_Drive | DeHC_Park [Enumerative]; Debounce = 300 [sec]; NH3 Deviation > **m_NH3_StrgDevErrMinThrsh** [g] NH3 Deviation < **m_NH3_StrgDevErrMaxThrsh**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NH3 storage has to be: - higher than first calibration curve (f[SCR Average Temperature]) AND - lower than second calibration curve (f[SCR Average Temperature]); Debounce time has been elapsed when NH3 storage deviation error or NH3 storage conditions becomes in range; SCR Dosing in NH3 Storage Control or in Intrusive NH3 Storage Control; Debounce time has to be counted after entering on NH3 Storage Control; Diesel Exhaust Fluid Quality mesurement (concentration read by DEF Quality Sensor) higher than calibration with hysteresis (conditions active only if DEF Quality Sensor is available);	[g]; NH3 Storage > **m_NH3_StrgMinThrsh** [g] NH3 Storage < **m_NH3_StrgMaxThrsh** [g]; Debounce = 0 [sec]; Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 0 [sec]; DEF Concentration > 30 [Pct]; 26 [Pct] < hysteresis range < 30 [Pct] DEFQS Present= 1 [Boolean];		

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (US Market - 3 pressure sensor configuration)	P2227	This monitor is used to identify BARO sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If BARO sensor is not in agreement with the other two the monitor is able to pinpoint BARO as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 50.00 [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		
			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:	> 10.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (Diesel, pull-down)	P2229	Detects a continuous short to power in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 94.1 % of 5 Volt Range (This is equal to 115.1 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Boost System A Performance (OBDII market only)	P2263	This monitor is used to detect any malfunction in the boost pressure control system causing very high or low intake manifold pressure that could lead to overspeed the turbine. It works only in steady state closed loop pressure control zone, tipically in the turbine overspeed area outside of the FTP test cycle. The DTC checks a positive or negative control deviation of the boost pressure indicating an underboost or overboost condition. The aim of the boost pressure system performance monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold (underboost) or obstructions in the exhaust pipe (overboost) that lead to overspeed the turbine.	Boost pressure tracking error: difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): < (**P2263: Boost pressure system performance negative error threshold (throttle control active)** [kPa] x **P0234, P2263: Overboost barometric correction**) OR > (**P2263: Boost pressure system performance positive error threshold (throttle control active)** [kPa] x **P0299, P2263: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old (Engine Coolant Temperature	1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -7.00 [°C] AND < 55.00 [°C] > -18 [kPa/s] AND < 24 [kPa/s] > 60 [°C]	160.00 fail counters over 200.00 sample counters sampling time is 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				flags" Free Form): < (**P2263: Boost pressure system performance negative error threshold (throttle control not active)** [kPa] x **P0234, P2263: Overboost barometric correction**) OR > (**P2263: Boost pressure system performance positive error threshold (throttle control not active)** [kPa] x **P0299, P2263: Underboost barometric correction**)	OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature Ambient Air Pressure in range Throttle Valve position Engine speed in range Desired intake Boost pressure in range No active DTCs All enabling conditions last for a time	==TRUE < 117 [°C] > 70 [kPa] AND < 110 [kPa] >= 100.00 [%] 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) > 2,750.00 [rpm] AND < 3,500.00 [rpm] > 200.00 [kPa] AND < 270.00 [kPa] AIC_BstSysDiagDenomDsbl ==FALSE >		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Inlet Pressure (TCIAP) Sensor Performance (US Market - 3 pressure sensor configuration)	P227B	This monitor is used to identify TCIAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running) If TCIAP sensor is not in agreement with the other two the monitor is able to pinpoint TCIAP as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crank relay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	== 1.00 > 11.00 [V] < 1,100.00 [rpm] < 50.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		
			TCIAP Pressure OR TCIAP Pressure 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:	> 10.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor Circuit C Low (Diesel, pull-up)	P227C	Detects a continuous short to ground in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	< 39.0 % of 5 Volt Range (This is equal to 49.7 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor Circuit C High (Diesel, pull-up)	P227D	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	> 90.0 % of 5 Volt Range (This is equal to 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 12.5 milliseconds previous)	> 150 kPa 80 consecutive BARO C readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 - Forced Engine Shutdown (OBD2)	P228A	Determine when rail pressure is lower than desired setpoint and metering unit actuator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded fuel flow for metering unit	> 40 MPa ≥ Maximum flow deliverable by high pressure pump (refer to *RailPresCntrl* section)	Run crank voltage Engine running Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl*) No DTC active since key is on:	≥ 11.0 V P000F	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 2 - Forced Engine Shutdown (OBD2)	P228B	Determine when rail pressure is lower than desired setpoint and rail pressure regulator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded pressure for pressure regulator valve	> 40 MPa ≥ 30 to 30 MPa (see table **P228B Pressure Regulator completely closed command**)	Run crank voltage Engine running Pressure Regulator controlled in closed loop (refer to *RailPresCntrl*)	≥ 11.0 V	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low (OBD2)	P228C	Determine when rail pressure is lower than desired setpoint.	Rail pressure setpoint - measured rail pressure	> 15 to 80 MPa (see table **P228C Positive rail pressure deviation (MU)**)	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (**P228C P228D Low fuel level calibrated as enabling condition (MU)** AND LowFuelConditionDiagnostic (**P228C P228D Air ambient pressure calibrated as enabling condition (MU)** AND Air ambient pressure (**P228C P228D Air ambient temperature calibrated as enabling condition (MU)** AND Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 3.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -7 °C) P000F	640 failures out of 800 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	> 15 to 80 MPa (see table	Run crank voltage Engine running Pressure Regulator	≥ 11.0 V	640 failures out of 800 samples 12.5 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P229A Positive rail pressure deviation (PR))	controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity (**P229A P229B Low fuel level calibrated as enabling condition (PR)** AND LowFuelConditionDiagnostic (**P229A P229B Air ambient pressure calibrated as enabling condition (PR)** AND Air ambient pressure (**P229A P229B Air ambient temperature calibrated as enabling condition (PR)** AND Air ambient temperature	 > 3.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -7 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High (OBD2)	P228D	Determine when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< -80 to -12 MPa (see table **P228D Negative rail pressure deviation (MU)**	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl*) Fuel injected quantity Fuel temperature (**P228C P228D Low fuel level calibrated as enabling condition (MU)** AND LowFuelConditionDiagnostic (**P228C P228D Air ambient pressure calibrated as enabling condition (MU)** AND Air ambient pressure (**P228C P228D Air ambient temperature calibrated as enabling condition (MU)** AND Air ambient temperature No DTC active since key is on:	≥ 11.0 V > 3.0 mm^3/stroke > -40 °C = FALSE) ≥ 60 kPa) ≥ -7 °C) P000F	640 failures out of 800 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	< -12 MPa	Run crank voltage Engine running	≥ 11.0 V	640 failures out of 800 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Pressure Regulator controlled in closed loop (refer to RailPresCntrl) Fuel injected quantity **P229A P229B Low fuel level calibrated as (enabling condition (PR)** AND LowFuelConditionDiagnostic (**P229A P229B Air ambient pressure calibrated as enabling condition (PR)** AND Air ambient pressure (**P229A P229B Air ambient temperature calibrated as enabling condition (PR)** AND Air ambient temperature	 > 3.0 mm^3/stroke = FALSE) ≥ 60 kPa) ≥ -7 °C)	12.5 ms/sample	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 2 Control Circuit	P2294	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit: impedance between signal and controller ground	≥ 200 kΩ	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	≥ 11.0 V > 6.0 V	44 failures out of 88 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 2 Control Circuit Low Voltage	P2295	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground: impedance between signal and controller ground	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	≥ 11.0 V > 6.0 V	44 failures out of 88 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Solenoid 2 Control Circuit High Voltage	P2296	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power: impedance between signal and controller power	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	≥ 11.0 V > 6.0 V	44 failures out of 88 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249D	This diagnosis checks if the DEF injection system has exceeded limit of correction authority Monitoring is executed by compararing Long Term Adaptation Factor (LTAF) with a calibratable threshold: LTAF > OBD High Threshold The longterm adaptation factor is created based on the information given by the NH3 storage correction strategy, this factor represents the deviation of the complete SCR system measured and shall be used to compensate it by making a correction over the DEF injection quantity	Long Term Adaptation Factor (LTAF) higher than calibrateable Threshold	LTAF > 1.69	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Reductant Injection Control At Limit - Flow Too High	P249E	This diagnosis checks if the DEF injection system has exceeded limit of correction authority Monitoring is executed by compararing Long Term Adaptation Factor (LTAF) with a calibratable threshold: LTAF < OBD Low Threshold The longterm adaptation factor is created based on the information given by the NH3 storage correction strategy, this factor represents the deviation of the complete SCR system measured and shall be used to compensate it by making a correction over the DEF injection quantity	Long Term Adaptation Factor (LTAF) lower than calibrateable Threshold	LTAF < 0.41	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal ($189/$199)	Message <> two's complement of message	Diagnostic Status	Enabled	>= 16 failures out of 20 samples.	Type B, 2 Trips
					Power Mode	= Run	Performed on every received message	
			OR		Ignition Voltage	> 6.41 volts		
			Rolling count error - Serial Communication message ($189/$199) rolling count index value	Message <> previous message rolling count value + one			>= 6 Rolling count errors out of 10 samples.	
					Engine Running	= True	Performed on every received message	
			OR		Run/Crank Active	> 0.50 Sec		
			Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase	> 510 Nm	No Serial communication loss to TCM (U0101)	No loss of communication	>= 6 range errors out of 10 samples. Performed on every received message	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unmetered Fuel - Forced Engine Shutdown	P25BD	Determines if engine overspeed condition is occuring when no fuel is being delivered	Engine Speed exceeds a threshold for a period of time	Fail Condition: Engine Speed > 5,000 RPM		Engine Speed > 1,500 RPM	Fail threshold: Overspeed condition TRUE > 25.0 milliseconds	Type A, 1 Trips
			Engine Speed less than a threshold for a period of time	Pass Condition: Engine Speed < (5,000 - 300) RPM		Engine Speed > 1,500 RPM	Pass threshold: Overspeed condition FALSE > 25.0 milliseconds	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Shared High Side Drive #2 Control Circuit Low (STG) - (GEN III Controllers ONLY)	P2670	Controller specific output driver circuit diagnoses the shared high sided driver # 2 for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	- Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. - Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between output and controller ground	Shared high side drive #2 low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 6.00 = ON	5 failures out of 10 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Shared High Side Drive #2 Control Circuit High (STP) - (GEN III Controllers ONLY)	P2671	Controller specific output driver circuit diagnoses the shared high sided driver # 2 for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	- Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. - Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between output and controller power	Shared high side drive #2 diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 6.00 = ON	20 failures out of 25 samples 100 ms / sample	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Supply Heater Control Circuit High	P2689	Controller specific output driver circuit diagnoses the Fuel Supply Heater Control Relay low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power: impedance between signal and controller power	≤ 0.5 Ω	Powertrain relay voltage Run crank voltage Engine not cranking	≥ 11.0 V > 6.0 V	10 failures out of 20 samples 100ms/sample	Type C, No SVS

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF Quality Sensor Erratic Temperature	P2ADD	This diagnosis verify if the DEF Quality Temperature Sensor signal dynamic is plausible.	This monitor checks if the dynamic behaviour of the DEF Quality Sensor signal is out of calibratable thresholds. QS thermistor raw value OR QS thermistor raw value	> (1-α) * 155.00 °C + (Last good sample * α) < (1-α) * -55.00 °C + (Last good sample * α) with: α = e^[-(amount of consecutive bad samples * 0.08)]	Powertrain relay voltage Run/Crank is Active Engine in Cranking Phase No electrical fault on DEF QS thermistor is present No loss of CAN communication DEF-C Controller not in initialization condition No electrical fault on DEF QS is present No electrical fault on DEF Quality Sensor SENT circuit No performance fault on DEF Quality Sensor SENT circuit	> 11.00 V TRUE FALSE DQMR_DEFQS_PZT_ElecFlt == FALSE CAN_LostComm_FltN_BusB_DEF_C == FALSE TRUE DQMR_DEFQS_ElecFlt == FALSE DQMR_DEFQS_SENT_ElecFA == FALSE DQMR_DEFQS_SENT_PerfFA == FALSE	Time counter: 100.00 fails out of 125.00 samples Task = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0076 Normal CAN transmission on Bus S Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for Message $0BD Message $0C7 Message $0F9 Message $189 Message $199 Message $19D Message $1AF Message $1F5 Message $4C9	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Reductant Control Module (SCR)	U010E	This DTC monitors for a loss of communication with the Reductant Control Module (SCR)	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					U0074	Not Active on Current Key Cycle		
			Message $092	≥ 10.00 seconds				
			Message $4CC	≥ 10.00 seconds	Normal CAN transmission on Bus B	Enabled		
			Message $4CD	≥ 10.00 seconds	Device Control	Not Active		
			Message $4E5	≥ 10.00 seconds				
			Message $4E6	≥ 10.00 seconds	High Voltage Virtual Network Management	Not Active		
			Message $4E7	≥ 10.00 seconds	Ignition Voltage Criteria:			
			Message $4E8	≥ 10.00 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
			Message $4E9	≥ 10.00 seconds				
					Power Mode	= run		
					Off Cycle Enable Criteria:			
					KeCAND_b_OffKeyCycleDiagEnbl	= 1 (1 indicates enabled)		
					Ignition Accessory Line and	= Active		
					Battery Voltage	> 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	> 0.4000 seconds		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	Message is not received from controller for Message $0C1 Message $0C5 Message $1C7 Message $1E9 Message $2F1 Message $2F9	 ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 0.5 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for Message $0F1 Message $12A Message $1E1 Message $1F1 Message $1F3 Message $3C9 Message $3CB Message $3F1 Message $451 Message $4D7 Message $4E1 Message $4E9	≥ 0.5 seconds ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With NOx Sensor A	U029D	This DTC monitors for a loss of communication with the NOx Sensor A	Message is not received from controller for Message $0B0 Message $0B1 Message $0B5 Message $0B7 Message $289 Message $293 Message $591	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With PM Sensor (Diesel Particulate)	U02A3	This DTC monitors for a loss of communication with the PM Sensor (Diesel Particulate)	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					U0074	Not Active on Current Key Cycle		
			Message $3A3	≥ 10.00 seconds	Normal CAN transmission on Bus B	Enabled		
			Message $3A5	≥ 10.00 seconds				
			Message $3A7	≥ 10.00 seconds	Device Control	Not Active		
			Message $3A9	≥ 10.00 seconds	High Voltage Virtual Network Management	Not Active		
			Message $3AB	≥ 10.00 seconds	Ignition Voltage Criteria:			
			Message $497	≥ 10.00 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
					Power Mode	= run		
					Off Cycle Enable Criteria:			
					KeCAND_b_OffKeyCycleDiagEnbl	= 1 (1 indicates enabled)		
					Ignition Accessory Line and	= Active		
					Battery Voltage	> 11.00 Volts		
					General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds			
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	> 0.4000 seconds		
					U02A3	Not Active on Current Key		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Cycle		
					PM Sensor (Diesel Particulate)	is present on the bus		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					c10) Fuel Pump Duty Cycle Fault Active c11) Sensor Configuration [FDBR_e_FuelPresSnsrConfig] c12) Sensor Bus Relay On d) Emissions Fuel Level Low [Message $3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow] h) Diagnostic System Disabled [DRER_b_DiagSysDsb] j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr DTC] j2) CAN Sensor Bus message $0C3_Available j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and	c10) <> TRUE c11) == CeFDBR_e_WiredTo_ECM c12) == TRUE d) <> TRUE e) == TRUE f) == Normal Control OR == Fuel Pres Sensor Stuck Control g) >= 0.05 gm/sec h) <> TRUE j1) <> TRUE j2) == TRUE j3) <> TRUE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_ECM == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures / 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig] d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3_Available d4) Fuel Pres Sensor Ref	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_ECM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures / 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_ECM <> WiredTo FTZM, then see Case1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted High Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_ECM == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures / 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig] d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3_Available d4) Fuel Pres Sensor Ref	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_ECM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures / 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_ECM <> WiredTo FTZM, then see Case1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Reset Signal Message Counter Incorrect	P1000	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Reset Signal	Communication of the Alive Rolling Count or Protection Value from the FPDCM over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage Performance (Only on applications that use an FTZM)	P1002	Detects low system voltage performance of the fuel pump driver control module system. This diagnostic reports the DTC when the absolute value of the difference between the fuel pump driver battery voltage and the fuel pump driver run/crank voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Run Crank voltage low and high	ABS (Fuel Pump Driver Control Module Battery voltage - Fuel Pump Driver Control Module Run Crank voltage) > 3.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Performance diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available FTZM Run Crank Active is TRUE Starter motor not engaged Sensor Bus relay is commanded ON	 = 1	40 failures out of 50 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Reset Error	P1005	This DTC monitors for a reset error in the Fuel Pump Driver Control Module	If the received value for the time since the last FPDCM reset has reset and the newly received value or previous value is	<= 0.50 seconds	DTC is enabled	1.00 (1 indicates enabled)	Diagnostic runs in 50 ms loop.	Type A, 1 Trips
			for	>= 2.00 counts	Sensor bus relay	On		
			out of total samples	>= 400.00 counts	Battery voltage	> 11.00 Volts		
					P1000	Not active		
					U18A2	Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Ignition Switch Run/ Start Position Circuit High (Only on applications that use an FTZM)	P1007	Detects high voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit high	FTZM Run Crank Active is TRUE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = FALSE	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Temperature (Fuel Tank Zone Module) Too High Signal Message Counter Incorrect	P1009	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module (FTZM) Temperature Too High Signal Message	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Driver Control Module over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 100ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Control Signal Message Counter Incorrect	P100A	This DTC monitors for an error in communication with the Turbocharger Boost Control Signal	Communication of the Turbo Actuator Error Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Status Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Learned Relative Position Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Actual Position Alive Rolling Count or Protection Value	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On	Executes in 10ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			from the VGTA over CAN bus is incorrect					
			for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			or					
			Communication of the Turbo Actuator Supply Voltage Count or Protection Value from the VGTA over CAN bus is incorrect					
			for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			or					
			Communication of the Turbo Actuator Temperature Unprocessed Value Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect					
			for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			or					
			Communication of the Turbo Actuator Learned Absolute Position Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect					
			for	>= 8.00 counts				

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Signal Message Counter Incorrect	P1100	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 2 Signal Message Counter	Communication of the Fuel Level Sensor 2 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1178	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent < 87.75 Percent > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	P1179	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent < 87.75 Percent > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Command Signal Message Counter Incorrect	P11FF	This DTC monitors for an error in communication with the Fuel Pump Command Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Signal Message Counter Incorrect	P1200	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 1 Signal Message Counter	Communication of the Fuel Level Sensor 1 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage Low (Only on applications that use an FTZM)	P129B	Detects low voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage drops below a calibrated value.	Fuel Pump Driver Control Module System Voltage Low	Fuel Tank Zone Module (FTZM) Battery Voltage <= 9.00	Fuel Tank Zone Module (FTZM) is present on vehicle		400 failures out of 500 samples 12.5 ms / sample	Type B, 2 Trips
					Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled	= 1		
					Fuel Tank Zone Module (FTZM) serial messages are available			
					Starter motor not engaged			
					Sensor Bus relay is commanded ON			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage High (Only on applications that use an FTZM)	P129C	Detects high voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage exceeds a calibrated value.	Fuel Pump Driver Control Module System Voltage High	Fuel Tank Zone Module (FTZM) Battery Voltage >= 18.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Sensor Bus relay is commanded ON	 = 1	400 failures out of 500 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Ignition Switch Run/ Start Position Circuit Low (Only on applications that use an FTZM)	P129D	Detects low voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage is below a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit low	FTZM Run Crank Active is FALSE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = TRUE	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P129F	FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed	Sensed Filtered Fuel Pump Speed Error	> Speed Error Low Threshold [Supporting Table] **P129F Threshold Low** OR < Speed Error High Threshold [Supporting Table] **P129F Threshold High**	a) Diagnostic Enabled FABR Speed Rationality Diagnostic b) CAN Sensor Bus message $0CB_Available c) FABR Fuel Control Enable Fault Active d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr] e) FABR Fuel Pump Ckt FA f) FABR Driver OverTemp FA g) Run_Crank input Voltage h) Sensor Bus Relay On j) CAN Sensor Bus message $0CB Data Fault [CFMR_b_FTZM_Info8_ARC_ChkErr] k) CAN Sensor Bus message $0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA] l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA] m) Timer - FABR Rising Edge Diagnostic Delay n) Timer - FABR Falling Edge Diagn Delay	a) == TRUE b) == TRUE c) <> TRUE d) <> TRUE e) <> TRUE f) <> TRUE g) > 11.00 volts h) == TRUE j) <> TRUE k) <> TRUE l) <> TRUE m) > 0.90 seconds n) > 0.90 seconds	1 sample / 12.5 msec	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module (Fuel Tank Zone Module) Control Signal Message Counter Incorrect	P12A8	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Control Signal Message	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 seconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor B Reference Feedback Range/ Performance [use with FTZM device and dual fuel tanks combination]	P143E	Fuel level sensor(s) for some vehicle applications may be connected to a Fuel Tank Zone Module (FTZM) that is located in close proximity to the fuel tank, instead of being wired directly to the engine control module (ECM). This diagnostic detects errors in sensed reference voltage signal pulse width compared to the ECM commanded value and sensed reference voltage period compared to the ECM commanded value for the primary fuel tank sensor. The FTZM measures the period and pulse width of the reference voltage signal supplied to each fuel level sensor and transmits the measurements to the ECM via serial data for a pass/fail determination. The FTZM conforms to OBD2 "smart" device rules and, as such, the ECM serves as the diagnostic host for it. To reduce overall power consumption, and to minimize the	Reference Voltage Signal Period Error [Commanded - Measured]	> 25.00 millisec	a] CAN Sensor Bus Message $2D7 Available b] Reference Voltage Period Availability Delay Timer c] Reference Voltage Pulse Width Available Synchronization Timer [IF ECM SUPPLIED] d] Diagnostic System Disabled e] CAN Sensor Bus Message $2D7 Fuel Level Sensor2 Signal Message Counter Incorrect [CFMR_b_FTZM_Info4_ARC_ChkErr] f] Reference Voltage Performance Diagnostic Enabled	a] == TRUE b] > 0.75 seconds c] > 1.25 seconds d] <> TRUE e] <> TRUE f] == TRUE	16.00 failures / 20.00 samples 250 millisec / sample	Type B, 2 Trips
			Reference Voltage Signal Pulse Width Error [Commanded - Measured]	> 1.50 millisec	a] CAN Sensor Bus Message $2D7 Available b] Reference Voltage Period Availability Delay Timer c] Reference Voltage Pulse Width Available Synchronization Timer [IF ECM SUPPLIED] d] Diagnostic System Disabled	a] == TRUE b] > 0.75 seconds c] > 1.25 seconds d] <> TRUE	16.00 failures / 20.00 samples 250 millisec / sample	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 5.50 Volts > 5.50 Volts	240 / 480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 3 High Voltage - (Diesel Controllers ONLY)	P16BF	Detects high voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 3 high voltage	Relay voltage >= 4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4wd high or low command incorrect	P17D4	The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is neutral, while the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.Monitor measures transfer caes gear ratio is not 4wd high ratio nor 4wd low ratio while the transfer case control module command state is either 4wd high or 4wd low.	Measured transfer case ratio is not in Low window AND Measured transfer case ratio is not in High window	4WD low ratio window <= 2.85 >= 2.50 4WD high ratio window <= 1.20 >= 0.80	Transfer case range command Incorrect range diagnostic enable calibration Engine torque Ignition voltage Battery voltage Engine speed Vehicle speed Transmission selected gear AND	≠ 4WD neutral = TRUE >= -20.00 Nm AND <= 1,000.00 Nm >= 9.00 V for >= 5.00 seconds >= 9.00 V for >= 5.00 seconds >= 700.00 RPM for >= 5.00 seconds >= 5.00 KM/H for >= 5.00 seconds Reverse or Drive (1st gear through 10th gear)	Fail count ≥ 280.00 Out of sample count ≥ 400.00 Update rate 12.5 milliseconds	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance [use with mechanical transfer pump dual fuel tanks]	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.	****************************** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ****************************** This subtest is not used If fuel volume in primary tank is and fuel volume in secondary tank is and remains in this condition for of fuel consumed by the engine. OR ****************************** Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long ****************************** This subtest is not used Volume in primary tank is and volume in secondary tank is and remains in this condition for OR ****************************** Fuel consumed without a Secondary Fuel Level Change	≥ 1,024.0 liters < 0.0 liters 18.0 liters < 1,024 liters > 7 liters 2,430 seconds	Engine Running No active DTCs: Volume in secondary tank	 VehicleSpeedSensor_FA ≥ 7.0 liters	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			****************************** If the vehicle is driven with the fuel consumed by the engine of without the secondary fuel level changing by 5 liters, then the sender must be stuck.	30 liters				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit Low Voltage [use with dual fuel tanks]	P2067	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 % or 151.42 liters			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit High Voltage [use with dual fuel tanks]	P2068	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 % or 2.02 liters			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump 2 Relay Control Circuit Open	P2632	Controller specific output driver circuit diagnoses the secondary/Transfer feed fuel pump high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 400.00 RPM	20 failures out of 25 samples 250 ms / sample	Type C, No SVS Not "Special" Type C Note: In certain controllers P2634 may also set (Fuel Pump 2 Relay Short to Power).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump 2 Relay Control Circuit Low	P2633	Controller specific output driver circuit diagnoses the secondary/Transfer feed fuel pump high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 400.00 RPM	20 failures out of 25 samples 250 ms / sample	Type C, No SVS Not "Special" Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump 2 Relay Control Circuit High	P2634	Controller specific output driver circuit diagnoses the secondary/Transfer feed fuel pump high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 400.00 RPM	20 failures out of 25 samples 250 ms / sample	Type C, No SVS Not "Special" Type C Note: In certain controllers P2632 may also set (Fuel Pump 2 Relay Open Circuit).

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fault Active [DTC P12A6]			
					c11) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c11) <> TRUE		
					c12) Fuel Pump Speed Fault Active [DTC P129F]	c12) <> TRUE		
					c13) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_Info1_UcodeCmFA DTC P165C]	c13) <> TRUE		
					c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	c14] <> TRUE		
					c15) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c15) == CeFDBR_e_WiredTo_ECM		
					c16) Sensor Bus Relay On	c16) == TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == NORMAL		
					g) Run_Crank input circuit voltage	g) 11.00 volts <= Run_Crank_V <= 32.00 volts		
					h) High Pres Fuel Pump	h) <> TRUE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump 2 Flow Insufficient [use with electric transfer pump dual fuel tanks]	P2636	This DTC detects if there is insufficient fuel flow from the secondary to the primary tank.	****************************** During fuel transfer ****************************** When the enable conditions are met, 10.0 liters of fuel will be transferred from the secondary tank and 10.0 liters of fuel will be transferred into the primary tank within 500 seconds. There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer begins. If the secondary tank volume does not decrease by the cal amount and the primary volume does not increase by the cal amount after the fail timer has expired, then P2636 sets.		Transfer pump is commanded on for the maximum time limit referenced in **P0461 P2066 P2636 Transfer Pump Enable Time Table** (see Supporting Table)		Secondary Fuel Transfer Pump on for 500 seconds	Type C, No SVS Not "Special Type C"
					No device control for the transfer pump			
					Fuel volume in secondary tank	< 136 liters		
					Vehicle Speed	< 0 MPH		
					No active DTCs:	VehicleSpeedSensor_FA		
					Engine Running			
			OR ****************************** Fuel Level in Secondary Tank Remains in an Unreadable Range too Long ******************************					
			Secondary fuel volume remains after a delay of 20 seconds to allow fuel slosh to settle.	> 136 liters	No device control for the transfer pump			
					Fuel volume in secondary tank	> 136 liters		
					Transfer Pump On Time	> 600 seconds		
					Vehicle Speed	< 0 MPH		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs: Engine Running	VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Four Wheel Drive Low Switch Circuit	P2771	The 4WD low switch is used to indicate 4WD high or 4WD low as requested by the vehicle driver. Fail case 1: continuous open in which the 4WD low switch circuit indicates 4WD high ratio, not in 4WD low ratio, but the measured transfer case ratio is 4WD low ratio. Fail case 2: continuous ground short in which the 4WD low switch circuit indicates 4WD low ratio, not in 4WD high ratio, but the measured transfer case ratio is 4WD high ratio. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	fail case 1: 4WD low switch raw value transfer case measured gear ratio, update fail time 1 OR fail case 2: 4WD low switch raw value transfer case measured gear ratio, update fail time 2	= FALSE ≥ 2.600 and ≤ 2.800 = TRUE ≥ 0.900 and ≤ 1.100	diagnostic monitor enable engine torque engine torque engine speed engine speed ignition voltage (controller run crank ignition in range) throttle position without idle throttle position without idle transmission fluid temperature transmission fluid temperature engine run time vehicle speed transmission gear (auto trans) clutch pedal position (manual trans) DTCs not fault active	= 0 Boolean ≥ 60.0 Nm ≤ 8,191.8 Nm ≥ 1,000 RPM ≤ 5,500 RPM ≥ 11.00 volts ≥ 3.0 % ≤ 99.0 % ≥ -6.7 ºC ≤ 130.0 ºC ≥ 10.0 seconds ≥ 10.00 MPH = forward drive gear ≤ 68.0 % TPS_FA EngineTorqueEstInaccurate P0502, P0503, P0716, P0717, P07BF, P07C0 P0722, P0723, P215B, P215C, P2160, P2161, U0101	fail time 1 ≥ 2.0 seconds, increment fail count 1, fail count 1 ≥ 1 counts fail time 2 ≥ 7.0 seconds, increment fail 2 count, fail 2 count ≥ 1 counts fail time an fail count 100 milliseond update rate	Type X, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio	P279A	Monitor measured transfer case gear ratio is 4WD low while the transfer case control module command state is 4WD high. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	Measured transfer case ratio is in 4WD low ratio window	4WD low ratio window ≤ 2.85 ≥ 2.50			Fail count ≥ 280.00 Out of sample count ≥ 400.00 seconds Update rate 12.5 milliseconds	Type B, 2 Trips
					Transfer case range command	= 4WD high		
					High range diagnostics enabled calibration	= TRUE		
					Engine torque	>= 60.00 Nm AND <= 1,000.00 Nm		
					Ignition voltage	>= 9.00 V for >= 5.00 seconds		
					Battery voltage	>= 9.00 V for >= 5.00 seconds		
					Engine speed	>= 700.00 RPM for >= 5.00 seconds		
					Vehicle speed	>= 5.00 KM/H for >= 5.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Transmission selected gear AND Diagnostic enable for currently selected transmission gear (Reverse, 1st through 10th gear, individually calibrated)	Reverse or Drive (1st gear through 10th gear) = TRUE		
					transmission gear shift direction	No shift in progress >= 5.00 seconds		
					Tap up/down mode OR Diagnostic enable for Tap up / tap down mode in current transmission gear (Reverse, 1st through 10th gear, individually calibrated)	INACTIVE = TRUE		
					Transfer case range	= Transfer case range previous >= 5.00 seconds		
					Transmission fluid temperature	>= -7.00 degree C >= 5.00 seconds		
					Run crank active	TRUE		
					Diagnostics system calibration enabled	TRUE		
					PTO OR ratio diagnostics in PTO enabled	active = TRUE		
					DTCs			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio	P279B	Monitor measures transfer case gear ratio is 4WD high ratio while the transfer case control module command state is 4WD low. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	Measured transfer case ratio is in 4WD high ratio window	4WD high ratio window ≤ 1.20 ≥ 0.80	Transfer case range command Low range diagnostics enabled calibration Engine torque Ignition voltage Battery voltage Engine speed Vehicle speed Transmission selected gear AND Diagnostic enable for currently selected	= 4WD low = TRUE >= 60.00 Nm AND <= 1,000.00 Nm >= 9.00 V for >= 5.00 seconds >= 9.00 V for >= 5.00 seconds >= 700.00 RPM for >= 5.00 seconds >= 5.00 KM/H for >= 5.00 seconds Reverse or Drive (1st gear through 10th gear) = TRUE	Fail count ≥ 280.00 Out of sample count ≥ 400.00 seconds Update rate 12.5 milliseconds	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD neutral command not 4WD neutral ratio	P279C	Monitor measured transfer case gear ratio is 4WD high ratio or 4WD low ratio while the transfer case control module command state is 4WD neutral. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	Measured transfer case ratio is in 4WD low ratio window OR Measured transfer case ratio is in 4WD high ratio window	4WD low ratio window ≤ 2.85 ≥ 2.50 4WD high ratio window ≤ 1.20 ≥ 0.80	Transfer case range command Neutral range diagnostics enabled calibration Engine torque Ignition voltage Battery voltage Engine speed Vehicle speed Transmission selected	= 4WD neutral = TRUE >= -20.00 Nm AND <= 1,000.00 Nm >= 9.00 V for >= 5.00 seconds >= 9.00 V for >= 5.00 seconds >= 700.00 RPM for >= 5.00 seconds >= 5.00 KM/H for >= 5.00 seconds Reverse or Drive (1st	Fail count ≥ 800.00 Out of sample count ≥ 1,000.00 seconds Update rate 12.5 milliseconds	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the transfer case control module	Message is not received from controller for Message $1CB Message $1CC	 ≥ 10.0 seconds ≥ 0.5 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Glow Plug Control Module	U0106	This DTC monitors for a loss of communication with the Glow Plug Control Module	Message is not received from controller for Message $3BD	≥ seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Turbocharger Boost Control Module	U010C	This DTC monitors for a loss of communication with the Turbocharger Boost Control Module	Message is not received from controller for Message $099 Message $499	 ≥ 10.00 econds ≥ 10.00 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Driver Control Module on Bus S	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus S	Message is not received from controller for Message $0D5 Message $0D7	 ≥ 4.00 seconds ≥ 4.00 seconds	General Enable Criteria: U0076 Normal CAN transmission on Bus S Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) =Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

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

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 (Single and Two stage VGT DC Motor)	P003A	This monitor checks if the VGT position SENT sensor has an offset with respect to the nominal positions where the valve does the learning procedure (fully closed and/or fully open)	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	< 86.00 [%5V] OR > 95.00 [%5V] OR < 16.06 [%5V] OR > 38.89 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: -engine coolant temperature in range; - no faults present on coolant temperature sensor. No faults present on VGT position sensor, VGT valve, VGTposition deviation. End Of Trip event has elapsed	== 1.00 >= 0.00 (°C) <= 117.00 (°C) ECT_Sensor_FA == FALSE VGT_PstnSnsrFA == FALSE VGT_ActCktFA == FALSE VGT_PstnCntrlFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Low	P007C	This monitor checks if the CAC up air temperature sensor is out of electrical range low	Charge air cooler up air temperature resistance value < low threshold	< 7.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit High	P007D	This monitor checks if the CAC up air temperature sensor is out of electrical range high	Charge air cooler up air temperature resistance value > high threshold	> 1,020,852.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_UpCktFA ==FALSE	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor Performance	P0101	This monitor checks if the MAF sensor measure is coherent with MAF estimation when the HP EGR and LP EGR (if present) are closed. It is able to detect MAF sensor wiring harness poor contacts, MAF sensor internal fault (offset), leaks from the induction air circuit, leaks from the recirculation exhuast gas circuit. For OBDII market, it is used to detect a PCV disconnection. The standard test can be calibrated to run when engine conditions are recognised as IDLE, OVERRUN or HIGH LOAD. An intrusive test can be enabled, to force the HP EGR to close when particular conditions are encountered, to allow the monitoring to run in idle.	Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 1.20 [ratio] < 0.80 [ratio]	Test enabled by calibration PT relay supply voltage in range Share High Side driver closed Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor OBDII Market: Outside Ambient Temperature in range OR Fault present on Ouside Air temperature EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature Induction air temperature	1.00 ==TRUE > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVld ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE > -7.00 [°C] OAT_PtEstFiltFA==TRUE > -7.00 [°C] OAT_OAT_SnsrNonEmissFA ==FALSE > -7.00 [°C]	400.00 fail counts out of 500.00 sample counts Functional 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.
					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	> 50.00 [°C] ==TRUE < 117.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.60 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 85.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					HP EGR valve position	<= 0.40 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR (if present) valve position	<= 1.00 [%]		
					No faults detected on LP EGR (if present) valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine works in IDLE, OVERRUN or HIGH LOAD condition	Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow	> 1.20 [ratio]	Intrusive Test enabled by calibration	0.00 ==TRUE	400.00 fail counts out of 500.00 sample counts Functional task: 12.5 ms	
			Drift low check: drift of the mass air flow	< 0.80 [ratio]	MAF rationality monitoring enabled by calibration	1.00 ==TRUE		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**		Diagnostic has not run in current driving cycle yet	==TRUE		
					Calibratable SCR dosing condition	IF 0.00 ==TRUE: SCR dosing condition is NH3 storage control OR intrusive NH3 storage control OR transient dosing control. IF 0.00 ==FALSE: No restrictions on SCR dosing		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR predicted NOx conversion efficiency	> 0.85 [ratio]		
					Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	< 3.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side driver closed	==TRUE		
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_NotVld ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE		
					OBDII Market: Outside Ambient Temperature in	> -7.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range OR Fault present on Ouside Air temperature EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature Induction air temperature No fault present on induction air temperature 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	 OR OAT_PtEstFiltFA==TRUE > -7.00 [°C] AND OAT_OAT_SnsrNonEmissFA ==FALSE > -7.00 [°C] IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE > 50.00 [°C] ==TRUE < 117.00 [°C] ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE > 69.60 [kPa] AAP_AmbientAirPresDfltd		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					barometric pressure sensor	==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 85.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					LP EGR (if present) valve position	<= 1.00 [%]		
					No faults detected on LP EGR (if present) valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine speed in range	> 700.00 [rpm] < 1,200.00 [rpm]		
					for a time	>= 1.00 [s]		
					Intake manifold pressure in range	> 70.00 [kPa] < 150.00 [kPa]		
					Intake manifold pressure is in steady state (SS)	when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, |Intake manifold pressure - p_ref| < 6.00 [kPa] for maintaining the SS ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Once all the conditions above are satisfied, additional conditions on HP EGR valve must be verified within a time limit	< 1.00 [s]		
					HP EGR valve position	<= 0.40 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					All conditions are verified for a time	> 5.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This monitor checks if the MAF sensor is out of electrical range low. The MAF sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	MAF frequency value	< 276.00 [Hz]	Test enabled by calibration	1.00 ==TRUE	100.00 fail counts out of 125.00 sample counts	Type A, 1 Trips
					Engine speed	>= 650.00 [rpm]		
					PT relay supply voltage in range	> 11.00 [V]	Function task: 100 ms	
					Share High Side Driver closed	==TRUE		
					All conditions are valid for a time	>= 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow (MAF) Sensor Circuit High	P0103	This monitor checks if the MAF sensor is out of electrical range high. The MAF sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	MAF frequency value	> 12,500.00 [Hz]	Test enabled by calibration	1.00 ==TRUE	100.00 fail counts out of 125.00 sample counts Function task:100 ms	Type A, 1 Trips
					Engine speed	>= 650.00 [rpm]		
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side Driver closed	==TRUE		
					All conditions arevalid for a time	>= 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Trim System Lean Bank 1	P0171	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its minimum value.	Released FSA fuel correction value	< refer to supporting table (**KtFADC_V_FSA_Fuel Min**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.00 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -7.00 [°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) > 1.00 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -7.00 [°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.
Injector 1 Open Circuit (For 4 Cylinder Engines)	P0201	This DTC checks the Injector 1 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit (For 4 Cylinder Engines)	P0202	This DTC checks the Injector 2 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit (For 4 Cylinder Engines)	P0203	This DTC checks the Injector 3 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit (For 4 Cylinder Engines)	P0204	This DTC checks the Injector 4 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing (For 4 Cylinder Engines)	P020A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 1 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing (For 4 Cylinder Engines)	P020B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 2 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing (For 4 Cylinder Engines)	P020C	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 3 The pull in period is the time for the injection current to rise to the current level (17.50 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 0.00 [us] OR > 130.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Control Circuit Low Voltage (For 4 Cylinder Engines)	P0261	This DTC detects a short circuit to ground of the low side driver circuit of Injector 1.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Control Circuit High Voltage (For 4 Cylinder Engines)	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 1 Maximum Authority Reached	P0263	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 1 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 1 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 1 saturated (positive or negative).	FAD_CB_Cyl_A_HiSaturated ==TRUE OR FAD_CB_Cyl_A_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO AND ECT_Sensor_FA)	125.00 Fails Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Control Circuit Low Voltage (For 4 Cylinder Engines)	P0264	This DTC detects a short circuit to ground of the low side driver circuit of Injector 2.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Control Circuit High Voltage (For 4 Cylinder Engines)	P0265	This 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_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 2 Maximum Authority Reached	P0266	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 2 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 2 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 2 saturated (positive or negative).	FAD_CB_Cyl_D_HiSaturated ==TRUE OR FAD_CB_Cyl_D_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature sensor.	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKOANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit Low Voltage (For 4 Cylinder Engines)	P0267	This DTC detects a short circuit to ground of the low side driver circuit of Injector 3.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit High Voltage (For 4 Cylinder Engines)	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 3 Maximum Authority Reached	P0269	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 3 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 3 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 3 saturated (positive or negative).	FAD_CB_Cyl_B_HiSaturated ==TRUE OR FAD_CB_Cyl_B_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKOANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Efficiency Below Threshold (OBDII market only)	P026A	This monitor checks the Charge Air Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Ambient air temperature).	< 42.00 [%]	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet Vehicle speed in range Air mass flow in range Engine coolant temperature in range OR OBD Coolant Enable Criteria Throttle valve position Pressure ratio through the compressor in range Temperature difference between upstream charge air cooler and ambient temperature in range Environmental pressure in range Environmental temperature in range	1.00 ==TRUE ==TRUE > 47.00 [kph] > 40.00 [mg/s] < 2,000.00 [mg/s] > 70.00 [°C] ==TRUE > 90.00 [%] > 1.30 [ratio] > 40.00 [°C] > 69.60 [kPa] > -7.00 [°C]	Test executed after 800.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on throttle position sensor	TPS_PstnSnsrFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on ambient temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on charge air cooler upstream and downstream temperature sensors	CIT_CAC_UpFA==FALSE CIT_CAC_DwnFA ==FALSE		
					No fault on MAF meter	MAF_MAF_SnsrFA ==FALSE		
					No fault on Intake Manifold Pressure sensor	MAP_SensorFA==FALSE		
					All the enabling conditions last for a time	>= 0.50 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Quantity Lower Than Expected	P026C	An error shall be detected when the fuel adjustment value (mm3) released by FSA is below a calibrated threshold.	Released FSA fuel correction value	< refer to supporting table (**KtFADD_V_FSA_ECM _LoThrsh**)[mm^3]	Following conditions are met for a calibrated time:	> 0.00 + 3.00 [s]	Time counter: 280 failures out of 560 samples. Time task 25[ms]	Type B, 2 Trips
					a. System voltage in range	> 11.00 [V]		
					b. FSA correction release enabled	refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid		
					c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time	refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 5.00 [s]		
					d. Ambient air pressure	> 67.00 [kPa]		
					e. Power Take-Off (PTO) is not active			
					f. (OBD Coolant Enable Criteria OR Engine coolant temperature)	= TRUE > 69.00 [°C]		
					g. Ambient air temperature	> -7.00 [°C]		
					h. Gear engaged for a time	different from Neutral or Parking > 7.00 [s]		
					i. Engine speed in operating range	> 400 [rpm] < 1,200 [rpm]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					j. Engine speed gradient for a time k. Injected fuel quantity in operating range l. Injected fuel quantity gradient for a time m. Vehicle speed in operating range for a time n. Enabled in combustion mode o. No Low fuel tank level indication p. No pending or confirmed DTCs	< 8,192 [rpm/25ms] > 7.00 [s] > 1.0 [mm^3] < 65.0 [mm^3] < 100.0 [mm^3/25ms] > 7.00 [s] > -10 [kph] < 3 [kph] > 10.00 [s] refer to supporting table **KaFADD_b_FSA_ECM_** (**EnblCmbMode**) LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld Transmission Estimated Gear Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Quantity Higher Than Expected	P026D	An error shall be detected when the fuel adjustment value (mm^3) released by FSA is above a calibrated threshold.	Released FSA fuel correction value	> refer to supporting table (**KtFADD_V_FSA_ECM_HiThrsh**)[mm^3]	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. Power Take-Off (PTO) is not active f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged for a time i. Engine speed in	> 0.00 + 3.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 5.00 [s] > 67.00 [kPa] = TRUE > 69.00 [°C] > -7.00 [°C] different from Neutral or Parking > 7.00 [s] > 400 [rpm]	Time counter: 280 failures out of 560 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					operating range j. Engine speed gradient for a time k. Injected fuel quantity in operating range l. Injected fuel quantity gradient for a time m. Vehicle speed in operating range for a time n. Enabled in combustion mode o. No Low fuel tank level indication p. No pending or confirmed DTCs	< 1,200 [rpm] < 8,192 [rpm/25ms] > 7.00 [s] > 1.0 [mm^3] < 65.0 [mm^3] < 100.0 [mm^3/25ms] > 7.00 [s] > -10 [kph] < 3 [kph] > 10.00 [s] refer to supporting table **KaFADD_b_FSA_ECM_** (**EnblCmbMode**) LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA_NotVld Transmission Estimated Gear Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Control Circuit Low Voltage (For 4 Cylinder Engines)	P0270	This DTC detects a short circuit to ground of the low side driver circuit of Injector 4.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 4 Maximum Authority Reached	P0272	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 4 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 4 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 4 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKOANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 5 Maximum Authority Reached	P0275	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 5 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 5 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 5 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKOANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 6 Maximum Authority Reached	P0278	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 6 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 6 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 6 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine coolant temperature	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKOANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 7 Maximum Authority Reached	P0281	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 7 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 7 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 7 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKO ANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder Balance 8 Maximum Authority Reached	P0284	The Cylinder Balancing (CB) strategy is able to get a cylinder by cylinder external torque equalization to improve engine smooth running (less engine speed roughness, more driving comfort).. The Cylinder Balancing uses as input of the closed loop the unbalancing signal and provide, as output, the fuel volume correction to apply on each cylinder. The target of the closed loop is to get zero unbalancing on all cylinders. The unbalancing signal cointains the torque formed during the combustion phase of each cylinder. This diagnosis is able to detect if Cylinder Balancing fuel volume correctionapplied on cylinder 8 reach the saturation (positive or negative) without achieve the target (zero unbalancing). When CB correction for cylinder 8 reach the saturation (positive or negative) the CB control system sets a Boolean flag to true in order to inform the Max	Cylinder Balancing Fuel Volume Correction on cylinder 8 saturated (positive or negative).	FAD_CB_Cyl_C_HiSaturated ==TRUE OR FAD_CB_Cyl_C_LoSaturated ==TRUE	Test enabled by calibration No faults detected on injectors Fuel Injector Disable Device Control not active CB enabled in closed loop EOL injector codes written No errors related to redundant calculation of EOL injector codes No Low fuel tank level indication Fuel request lower than a calibrateable threshold (function of Engine Speed) Fuel request higher than a calibrateable threshold (OBD Coolant Enable Criteria OR Engine coolant temperature higher than a calibrateable threshold) No faults on Engine	1.00 FUL_GenericInjSysFlt FUL_InjectorDisable FAD_CB_CntrlType ==CeFADC_e_CB_CL_Enbl FAD_EIA_DID_Written FAD_EIA_RedntFlt LowFuelConditionDiagnostic <= **KtFADD_V_CB_MaxAuthMaxFuelReq** >= 25.00 [mm3/stroke] ==TRUE >= -20.00 [°C] (ECT_Sensor_TFTKOANDECT_Sensor_FA)	125.00 Fail Samples over 175.00 samples. 1 sample every cylinder firing event.	Type B, 2 Trips

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit	P02E0	This monitor checks if the Throttle commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	== 1.00	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from wide open (default position)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Stuck Open	P02E4	This monitor checks if the Throttle valve got mechanically stuck in a position more open than what is required by the control	position tracking error (setpoint position - measured position) < negative threshold AND valve duty cycle < negative threshold	< -8.00 [%] AND < -80.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. No faults present on Throttle position sensor, Throttle valve, Throttle position deviation	== 1.00 > 5.00 [V] TPS_PstnShtOffReq == FALSE	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms after additional 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Stuck Closed	P02E5	This monitor checks if the Throttle valve got mechanically stuck in a position more closed than what is required by the control	position tracking error (setpoint position - measured position) > positive threshold AND valve duty cycle > positive threshold	> 8.00 [%] AND > 80.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. Position control in closed loop (no faults present on Throttle position sensor, Throttle valve, Throttle position deviation)	== 1.00 > 5.00 [V] TPS_PstnShtOffReq == FALSE	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit High (SENT position sensor)	P02E9	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range and SENT performance	== 1.00 > 11.00 [V] TPS_SENT_OOR_Flt== FALSE TPS_SENT_PerfFlt== FALSE	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

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

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

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

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

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)	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Sensor Circuit Low Voltage	P0405	This monitor checks if the HP EGR position analog sensor is out of electrical range low	analog position raw voltage < low threshold	< 4.50 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Sensor Circuit High Voltage	P0406	This monitor checks if the HP EGRposition analog sensor is out of electrical range high	analog position raw voltage > high threshold	> 95.00 [%5V]	Test enabled by calibration	== 1.00	192.00 fail counts out of 240.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor checks if the HP EGR valve got mechanically stuck in a position more open than what is required by the control	position tracking error (setpoint position - measured position) < negative threshold AND valve duty cycle < negative threshold	< -11.00 [%] AND < -80.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, position deviation	== 1.00 > 5.00 [V] EGR_PstnShtOffReq == FALSE	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Stuck Closed	P042F	This monitor checks if the HP EGR valve got mechanically stuck in a position more closed than what is required by the control	position tracking error (setpoint position - measured position) > positive threshold AND valve duty cycle > positive threshold	> 11.00 [%] AND > 80.00 [%]	Test enabled by calibration System out of the cranking phase Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, position deviation	== 1.00 > 5.00 [V] EGR_PstnShtOffReq== FALSE	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms after 96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Position Exceeded Learning Limit	P049D	This monitor checks if the HP EGR position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	analog position raw voltage when the valve is in fully closed position < low threshold OR analog position raw voltage when the valve is in fully closed position > high threshold	< 16.40 [%5V] OR > 25.10 [%5V]	Test enabled by calibration Learning procedure at key off in fully closed position has been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - valve is in fully closed position (measured position smaller than a threshold); - difference between max and min learned values is smaller than a threshold. Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, HP EGR position deviation End Of Trip event has elapsed	== 1.00 >= 70.00 [°C] <= 70.00 [°C] ECT_Sensor_FA == FALSE < 100.00 [%] < 100.00 [%] > 5.00 [V] EGR_PstnShtOffReq == FALSE	1.00 fail counts out of 1.00 sample counts Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 1	P0545	Controller specific output driver circuit diagnoses t the exhaust gas temperature 1 (EGT1) sensor signal high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 160 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 1	P0546	Controller specific output driver circuit diagnoses the exhaust gas temperature 1 (EGT1) signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the exhaust gas temperature 1 (EGT1) signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 900 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode case **SCR Temp1:** (transmission in Gear: Fuel quantity of the torque forming pulses transmission in Park/ Neutral: Fuel quantity of the torque forming pulses) case **SCR Temp2** (transmission in Gear: Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleT1_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT1_PN** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT2_G** [mm^3] depending on engine speed and engine coolant	**For enabling the monitor, all the following conditions must be satisfied continuously for more than** Test enabled by calibration and current gear and depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark (CeFULR_e_InGear: transmission CeFULR_e_NeutralPark: transmission CeFULR_e_InGearNeutralPark: transmission) and engine speed and engine speed	5.00 [s] 1.00 [Boolean] unchanged in gear in park/neutral in gear and in park neutral > hysteresis(511.00 , 511.00 + 0.00)[rpm] <hysteresis(1,560.00 , 1,560.00 + 0.00)[rpm]	200.00 failures out of 255.00 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			transmission in Park/ Neutral: Fuel quantity of the torque forming pulses) case **SCR Temp3** (transmission in Gear: Fuel quantity of the torque forming pulses transmission in Park/ Neutral: Fuel quantity of the torque forming pulses) case **HC unloading driving and park/neutral**	temperature < 0.5* **P054E_IFM_MinFuelIdleT2_PN** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT3_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleT3_PN** [mm^3] depending on engine speed and engine coolant temperature	and (OBD Coolant Enable Criteria OR engine coolant temperature) and outside air temperature and vehicle speed and enabled in the combustion mode and Accelerator Pedal Position and Engine running and PTO_PTO_Active and Run Crank voltage and if the transmission is manual	== TRUE > hysteresis(-21.00 , -20.00) [°C] > hysteresis(-21.00 , -20.00) [°C] < 3.00 [kph] **P054F_IFM_CombModesEnbl** <= 0.05 [%] - == 0 [Boolean] >= 11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(HCS_DeHC_Drive || HCS_DeHC_Park): (transmission in Gear: Fuel quantity of the torque forming pulses transmission in Park/ Neutral: Fuel quantity of the torque forming pulses) **default:** (transmission in Gear: Fuel quantity of the torque forming pulses transmission in Park/ Neutral: Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature < 0.5* **P054E_IFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature < 0.5*	(if the Gear is Neutral AND the clutch pedal position OR the clutch pedal position) and No active DTC's: Depending on the **OAT Source Calibration =** CeOATR_e_ECM_OAT_Sensor (CeOATR_e_NonOBD_NonECM_NonVICM: default:)	> 0.00 < 0.00 OAT_OAT_SnsrNonEmissFA OAT_PtEstFiltFA CrankSensor_TFTKO ECT_Sensor_FA Transmission Estimated Gear Validity VehicleSpeedSensor_FA AcceleratorPedalFailure ClutchPstnSnsr 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.
			)	**P054E_IFM_MinFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature				

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

Idle Control System - Fuel Quantity Higher Than Expected	P054F	This DTC detects if the fuel quantity of the torque forming pulse is higher than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case
			SCR Temp1:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			SCR Temp2
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				
				> 1.5* **P054F_IFM_MaxFuelIdleT1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleT1_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleT2_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(511.00 , 511.00 + 0.00) [rpm]
						
						< hysteresis(1,560.00 , 1,560.00 + 0.00) [rpm]
							200.00 failures out of 255.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

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

			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			SCR Temp3
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive ||
				> 1.5* **P054F_IFM_MaxFuelIdleT2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleT3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleT3_PN** [mm^3] depending on engine speed and engine coolant temperature
					{
					OBD Coolant Enable Criteria
					
					OR
					engine coolant temperature
					
					}
					
					and
					outside air temperature
					
					and
					vehicle speed
					
					and
					enabled in the combustion mode
					
					and
					Accelerator Pedal Position
					
					and
					Engine running
					
					and
					PTO_PTO_Active
					
					and
					Run Crank voltage
					
					and
					if the transmission is manual
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						< 3.00 [kph]
						
						P054F_IFM_CombModesEnbl
						
						<= 0.05 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]
						
						> 0.00		

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

			HCS_DeHC_Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			default:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
				> 1.5* **P054F_IFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_PN** [mm^3] depending on engine speed and
					OR
					
					the clutch pedal position
					)
					
					and
					No active DTC's:
					
					Depending on the **OAT Source Calibration =** CeOATR_e_ECM_OAT_Sensor
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						< 0.00
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPstnSnsr 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.
			}	engine coolant temperature				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance (For 8 Cylinder Engines)	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter - SPI error (SPI communication failed)	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 40 [V]) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 11.00 [V] - - 52.00 [V]	4 failures out of 8 samples 12.5 ms / sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance (For 4 Cylinder Engines)	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter - SPI error (SPI communication failed)	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 52 [V]) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 11.00 [V] - - 52.00 [V]	4 failures out of 8 samples 12.5 ms / sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injector Driver Circuit Performance Bank 1	P062D	This DTC detects if there is: open circuit of the power supply line of the injector or Boost voltage fault or ECU internal fault The monitoring determines if the boost voltage is above a threshold or below another threshlod with hysteresis	Internal ECU Boost Voltage	> 75.00 [V] OR < hysteresis(52.00 , 53.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	14 failures out of 20 samples 6.25 ms/sample Continuous	Type A, 1 Trips

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

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

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

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

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

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Driver High Temperature	P103F	This diagnosis verifies that the Motor Mosfet Driver Temperature is too High	Motor Mosfet Driver Temperature too High Error status == FAULT	VeSCRR_e_PmpDrvrHiTemp == FAULT	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage No loss of CAN communication Motor Mosfet Driver Temperature too High Error status provided by DEF control module different from INDETERMINATE	1.00 [Boolean] > 11.00 [V] U010E, Lost Communication With Reductant Control Module	40.00 failures out of 50.00 samples Time basis = 100ms/sample	Type A, 1 Trips

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Rail Pressure deviation during cut off	P1089	This diagnosis is able to check if, during SQA learning, the pressure set-point requested by SQA is correctly reached and maintained (in rail pressure range defined for SQA), in order to allow SQA to perform the learning.	Fuel Rail pressure	> SQA Rail Pressure Set-point + **KaFADC_p_SQA_Lrn Delt** OR < SQA Rail Pressure Set-point - **KaFADC_p_SQA_Lrn Delt**	Test enabled by calibration All enabling conditions for SQA learning different from Rail Pressure in range are satified Calibrateable delay time since SQA started to request rail pressure set-point has expired.	1.00 FAD_SQA_LrnPresEnbl 4,000.00	800.00 Fail Samples over 1,143.00 samples. 1 Sample every 12,5ms.	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Low	P10D6	This monitor checks if the CAC down air temperature sensor is out of electrical range low	Charge air cooler down air temperature resistance value < low threshold	< 7.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	> 1,020,852.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	== 1.00 > 11.00 [V]	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Air Cooler Temperature Sensor Down Circuit Intermittent/ Erratic	P10D8	This monitor checks if the CAC down air temperature has an intermittent fault	Charge air cooler down air temperature value > T_MAX_threshold Charge air cooler down air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 300.00 [°C] < -40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	== 1.00 > 11.00 [V] CIT_CAC_DwnCktFA ==FALSE	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor 4 Not Plausible	P113E	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 4 (EGT4) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT4 temperature| See the Description Tab for Reference Temperature, (EGT_Avg) definition	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTCs and with Reference temperature calculation done: - key on and with - minimum engine-off time and with - Number of sensor available for calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas4_CktTFTKO ==TRUE > 28,800.00 [sec] >=4	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor 5 Not Plausible DOC1+SCR +DOC2 +DPF	P113F	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 5 (EGT5) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) – EGT5 temperature| See the Description Tab for Reference Temperature, EGT_Avg definition	> 20 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with No Active DTCs and with Reference temperature calculation done: - key on and with - minimum engine-off time and with - Number of sensor availablefor calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas5_CktTFTKO ==TRUE > 28,800.00 [sec] >=4	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit	P115E	This diagnosis verifies Upstream NOx gen3 sensor O2 binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	open circuit on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Reference Voltage Circuit High Voltage	P1160	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit	P116A	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Linear pin (P-)	open circuit on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit Low Voltage	P116B	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Signal Circuit High Voltage	P116C	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Linear pin (P-)	powershort on P- pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Pump Current Control Circuit High Voltage	P116F	This diagnosis verifies Upstream NOx gen3 sensor O2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 30.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time No electrical fault detected on Soot Sensor If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass Ambient Air pressure Ambient air pressure sensor not faulty Time since Soot Sensor heating off when the sensor temperature has	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 9.00 V > 0.10 s NOT(SOT_ElecIFault) TPTKO on P1477 TPTKO on P1478 >51.00 KPa AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 28,800.00 s	No time debounce	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 1 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P118E	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	(Measured EGT1 - Modeled EGT1) > (Measured EGT1 - Modeled EGT1) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT1_DiagMdlFlt and Engine Off Timer and EGT1 Model Temperature and EGT1 Model Temperature and Dynamick check Valid and No faults on the consumed EGT sensors	1.00 > 11.00 Volts == FALSE > = 3,600.00 seconds > -40.00 degC < 850.00 degC ==TRUE EGT_ExhGas1_StkFA and EGT_ExhGas1_StkTFTKO and EGT_ExhGas1_CktFA and EGT_ExhGas1_CktTFTKO and EGT_ExhGas2_QckChgFA and EGT_ExhGas1_QckChgTFTKO	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and	>= 180.00 seconds		
					No faults on the consumed EGT sensors	>= 0.00 seconds		
					and	>= 180.00 seconds		
					Time since last DPF regeneration	**EGT1 DynChk EngPtEnbl**		
					and			
					Time after warm up			
					and	7.00 degC		
					Continuos engine run time	CeEGTR_e_Index2500ms		
					and			
					Fuel Rate and Engine Speed within bounds, determined by calibration map	1.00 seconds		
					and			
					Model Temperature Rate of change limited to:			
					over a time period of:			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 2 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P118F	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	(Measured EGT22 - Modeled EGT2) > (Measured EGT2 - Modeled EGT2) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT2_DiagMdlFlt and Engine Off Timer and EGT2 Model Temperature and EGT2 Model Temperature and Dynamick check Valid	1.00 > 11.00 Volts == FALSE > 3,600.00 seconds > -40.00 degC < 850.00 degC ==TRUE EGT_ExhGas2_CktFA and EGT_ExhGas2_CktTFTKO and EGT_ExhGas2_QckChgFA	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and	and EGT_ExhGas2_QckChgTFTKO		
					No faults on the consumed EGT sensors	and EGT_ExhGas2_QckChgFA		
					and	>= 300.00 seconds		
					Time since last DPF regeneration	>= 0.00 seconds		
					and	>= 180.00 seconds		
					Time afert warm up			
					and	**EGT2 DynChk EngPtEnbl**		
					Continuos engine run time			
					and	< 7.00 degC		
					Fuel Rate and Engine Speed within bounds, determined by calibration map	CeEGTR_e_IndexMax5000ms		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit	P1192	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Low Reference pin (Ref)	open circuit on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit Low Voltage	P1193	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Low Reference pin (Ref)	groundshort on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 O2 Low Reference Circuit High Voltage	P1194	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Low Reference pin (Ref)	powershort on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 3 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P1196	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT3 - Modeled EGT3) > Measured EGT3 - Modeled EGT3) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT3_DiagMdlFlt and Engine Off Timer and EGT3 Model Temperature and EGT3 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 3,600.00 seconds > -40.00 degC < 850.00 degC ==TRUE EGT_ExhGas3_CktFA and EGT_ExhGas3_CktTFTKO and	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults on the consumed EGT sensors and Time since last DPF regeneration and Time afert warm up and Continuos engine run time and	EGT_ExhGas3_QckChgFA and EGT_ExhGas3_QckChgTFTKO and EGT_ExhGas3_StkFA and EGT_ExhGas3_StkTFTKO >= 150.00 seconds >= 0.00 seconds >= 180.00 seconds **EGT3 DynChk EngPtEnbl** < 3.00 degC		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P1197	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT4 - Modeled EGT4) > Measured EGT4 - Modeled EGT4) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT4_DiagMdlFlt and Engine Off Timer and EGT4 Model Temperature and EGT4 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 3,600.00 seconds > 100.00 degC < 1,000.00 degC ==TRUE EGT_ExhGas4_CktFA and EGT_ExhGas4_CktTFTKO and EGT_ExhGas4_QckChgFA	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults on the consumed EGT sensors and Time since last DPF regeneration and Time afert warm up and Continuos engine run time and Fuel Rate and Engine Speed within bounds,	and EGT_ExhGas4_QckChgTFTKO and EGT_ExhGas4_StkFA and EGT_ExhGas4_StkTFTKO >= 300.00 seconds >= 0.00 seconds >= 180.00 seconds **EGT4 DynChk EngPtEnbl** < 200.00 degC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	CeEGTR_e_IndexMax5000ms 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 5 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P1198	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT5 - Modeled EGT5) > Measured EGT5 - Modeled EGT5) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT5_DiagMdlFlt and Engine Off Timer and EGT5 Model Temperature and EGT5 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 3,600.00 seconds >100.00 degC <1,000.00 degC ==TRUE EGT_ExhGas5_CktFA and EGT_ExhGas5_CktTFTKO and EGT_ExhGas5_QckChgFA	6.00 fail samples out of 8.00 Each sample is 10.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No faults on the consumed EGT sensors	and EGT_ExhGas5_QckChgTFTKO and EGT_ExhGas5_StkFA and EGT_ExhGas5_StkTFTKO		
					and			
						>= 300.00 seconds		
						>= 0.00 seconds		
					Time since last DPF regeneration			
					and	>= 180.00 seconds		
					Time afert warm up			
					and	**EGT5 DynChk EngPtEnbl**		
					Continuos engine run time			
					and			
						< 200.00 degC		
					Fuel Rate and Engine Speed within bounds, determined by calibration map	CeEGTR_e_IndexMax5000ms		

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit	P119D	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit Low Voltage	P119E	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 NOx-related measurement pin (M2)	groundshort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Signal Circuit High Voltage	P119F	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 NOx-related measurement pin (M2)	powershort on M2 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Performance During Deceleration Fuel Cut Off Bank 1 Sensor 2	P11B3	This DTC aims to detect a drift of Sensor 2 O2 measured value (A) from Sensor 1 O2 measured value (B) when the latter can be considered stable during overrun condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 2.00 [%] < -3.00 [%]	Engine running		EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRlb ==FALSE		
					Sensor 1 is fully operative	OXY_O2_NOx1_PresCmpNotRlb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld (MAF_SensorFA AND MAF_SensorTFTKO) OXY_NOx1_O2_Flt OXY_NOx2SignRngChkFlt NOX_Snsr2_PresFlt		
					DTC P2297 is running	(see P2297 Fault code)		
					Air mass flown since P2297	> 45.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Reference Voltage Circuit	P11BE	This diagnosis verifies Dowstream NOx gen3 sensor binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	open circuit on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Ground Circuit	P11C5	This diagnosis verifies Upstream NOx gen3 sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 1 heater reference pin (H-)	open circuit on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range	TRUE > 11.00 V TRUE FALSE > 10.8V	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	This diagnosis verifies the plausibility of Upstream NOx sensor signal	Check if (Upstream NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -42 % OR > 105.00 %	Engine is running	TRUE	Test per trip: 1	Type A, 1 Trips
					Powertrain relay voltage	> 11.00 V	If Fast Initial Response EWMA is active then 1 test per trip are allowed	
					No failure on any NOx model inputs	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					Injection small quantity adjustment (SQA) learning is not active	FAD_SQA_LrnET_Enbl ==FALSE	If Rapid Response EWMA is active then 1 test per trip are allowed	
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE	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.	
					No electrical failure on NOx1 sensor	NOX_Snsr1_ElecFA ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngLoFlt ==FALSE		
					No out of range high failure on NOx1 sensor	NOX_NOx1_OutOfRngHiFlt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE	The filter gain calibration (1) can assume the following values: - 0.52 if FIR is active - 0.52 if RR is active - 0.23 if neither FIR and RR are active	
					No failure on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No failure on ambient air temperature sensor	AmbPresDfltdStatus ==FALSE		
					no falut on upstream catalyst exhaust pressure model inputs	EGP_PresCatUpFlt ==FALSE		
					No failure on engine	ECT_Sensor_FA	(1) The EWMA	

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 Upstream NOx concentration Steady state detection: a) Modeled Upstream NOx concentration step at 100 ms. b) condition a) is fulfilled for time Ambient air pressure Outside air temperature Combustion mode dependent enabling flag Intake manifold absolute pressure Injection fuel quantity requested	==FALSE FUL_GenericInjSysFlt ==FALSE FHP_InjLeakage ==FALSE MAP_SensorFA==FALSE > 100 ppm < 5 ppm > 5.00 sec > 75 kPa < 120 kPa > -7 °C < 80 °C **NOX_S1_PlausChkEnblCmbMode** < 250 kPA For normal combustion mode: > 17.00 mm^3 < 50.00 mm^3 For other combustion modes:	filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						> 15 mm^3 < 30 mm^3		
					Engine speed	For normal combustion mode: > 1,500 rpm < 2,000 rpm For other combustion modes: > 0 rpm < 0 rpm		
					Engine coolant temperature	> 70 °C < 120 °C		
					Sensor dewpoint is reached	TRUE		
					Diagnostic test results during EWMA FIR mode	< 1		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Signal Circuit High Voltage	P11D2	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 O2 Linear pin (P-)	powershort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Upstream NOx sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window)	< -25.00 ppm > 50.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Upstream NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.80 V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 75.00 g/s > 0.00 g/s < 150.00 mg/s > 0.00 mg/s < 3,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 0.00 g and Upstream NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 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.
					range	> 1,500.00 rpm		
					Upstream NOx sensor temperature is within a range	< 500.00 °C > 0.00 °C		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 0.01 mm^3/s < 0.10 mm^3 > -1.00 mm^3 > 2.00 s		
					Intake manifold absolute pressure	< 950.00 kPa		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngLo Flt ==FALSE		
					No out of range high failure on NOx1 sensor	NOX_NOx1_OutOfRngHi Flt ==FALSE		
					No failure on NOx1 sensor signal plausibility	NOX_NOx1_NOxPlausFlt ==FALSE		
					No failure on NOx1 sensor signal dynamic	NOX_NOx1_DynChkFlt ==FALSE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2	P11D5	This diagnosis verifies if Downstream NOx sensor raw signal is affected by an offset	Check if NOx2 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window)	< -25.00 ppm > 3,000.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Downstream NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a	**NOX_S2_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 10.8V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00 % < 75.00 g/s > 0.00 g/s < 100.00 mg/s > 0.00 mg/s < 3,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 0.00 g and Downstream NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 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.
					range	> 1,500.00 rpm		
					Downstream NOx sensor temperature is within a range	< 330.00 °C > 225.00 °C		
					Time after DPF regen modes	> 120.00 s		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 0.01 mm^3/s < 0.10 mm^3 > -1.00 mm^3 > 2.00 s		
					Intake manifold absolute pressure	< 950.00 kPa		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx2 sensor	NOX_Snsr2_FltSt ==FALSE		
					No current control failure on NOx2 sensor	NOX_NOx2_StBitChkFlt ==FALSE		
					No out of range low failure on NOx2 sensor	NOX_NOx2_OutOfRngLo Flt ==FALSE		
					No out of range high failure on NOx2 sensor	NOX_NOx2_OutOfRngHi Flt ==FALSE		
					No failure on NOx2 sensor signal plausibility	NOX_NOx2_SelfDiagFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx2 sensor signal dynamic	NOX_NOx2_DynChkFlt ==FALSE		
					No failure on NOx2 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHP_InjLeakage ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					No failure on air control system	AIC_AirShtOffReq ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					Upstream SCR temperature is steady state: a) Upstream SCR temperature derivative within a range b) conditions a) is fulfilled for a time	< 50.00 °C/s > -50.00 °C/s > 0.00 s		
					No failure on Downstream SCR temperature sensor	NOX_Snsr2_TempFlt ==FALSE		
					No failure on upstream SCR temperature	EGT_TempSCR_UpFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit	P11D8	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit Low Voltage	P11D9	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Pump Current Control Circuit High Voltage	P11DA	This diagnosis verifies Downstream NOx gen3 sensor O2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Current Range/ Performance - Bank 1 Sensor 1	P11DB	This diagnosis verifies that Upstream NOx sensor embedded current control circuit status is healthy	Check if the NOx1 sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Ip1 within the interval of -40uA... 19uA b) Delta Ip0 < 300 uA /10 msec c) Delta Ip1 z 2.4 uA around its set point > 1 % > 1 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx1 sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	> 11.00 V TRUE FALSE > 10.80 V TRUE TRUE < 0.03 % >- 0.03 % > 10.00 sec TRUE NOX_Snsr1_FltSt ==FALSE **NOX_S1_StBitChkEnblCmbMode** <= 50.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec	NOx stability flag time counter: 8 fails out of 10 samples Lambda stability flag time counter: 8 fails out of 10 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Current Range/ Performance - Bank 1 Sensor 2	P11DC	This diagnosis verifies that Downstream NOx sensor embedded current control circuit status is healthy	Check if the NOx2 sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note:	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Ip1 within the interval of -40uA... 19uA b) Delta Ip0 < 300 uA /10 msec c) Delta Ip1 z 2.4 uA around its set point > 1 % > 1 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx2 sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	> 11.00 V TRUE FALSE > 10.80 V TRUE TRUE < 0.03 % >- 0.03 % > 10.00 sec TRUE NOX_Snsr2_FltSt ==FALSE **NOX_S2_StBitChkEnblCmbMode** <= 50.00 mm^3/s >= -50.00 mm^3/s > 5.00 sec	NOx stability flag time counter: 8 fails out of 10 samples Lambda stability flag time counter: 8 fails out of 10 samples Task=12.5ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit	P11FC	This diagnosis verifies Dowstream NOx gen3 sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Low Reference pin (Ref)	open circuit on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit Low Voltage	P11FD	This diagnosis verifies Downstream NOx gen3 sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Low Reference pin (Ref)	groundshort on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 O2 Low Reference Circuit High Voltage	P11FE	This diagnosis verifies Downstream NOx gen3 sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Low Reference pin (Ref)	powershort on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Supply Circuit	P122B	This monitor checks if the Throttle DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Control Circuit Shorted	P122C	This monitor checks if the Throttle commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Exceeded Learning Limit (SENT position sensor)	P122D	This monitor checks if the Throttle position SENT sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold	< 81.75 [%5V] OR > 95.75 [%5V]	Test enabled by calibration Key signal is off Learning procedure enabled: - no faults present on engine coolant temperature sensor; -the engine coolant tempearture is in range. Position control in closed loop: battery voltage above a threshold. No faults present on Throttle position sensor, Throttle valve, Throttle position deviation End Of Trip event has elapsed	== 1.00 ECT_Sensor_FA == FALSE >= 70.00 [°C] <= 117.00 [°C] > 5.00 [V] TPS_PstnShtOffReq== FALSE	1.00 fail counts out of 1.00 sample counts Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Positive Voltage Control Circuit Shorted to Control Circuit (For 4 Cylinder Engines)	P1248	This DTC detects a shorted load on Injector 1	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Positive Voltage Control Circuit Shorted to Control Circuit (For 4 Cylinder Engines)	P1249	This DTC detects a shorted load on Injector 2	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Positive Voltage Control Circuit Shorted to Control Circuit (For 4 Cylinder Engines)	P124A	This DTC detects a shorted load on Injector 3	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Positive Voltage Control Circuit Shorted to Control Circuit (For 4 Cylinder Engines)	P124B	This DTC detects a shorted load on Injector 4	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Positive Voltage Control Circuit Shorted to Control Circuit (For 8 Cylinder Engines)	P124C	This DTC detects a shorted load on Injector 5	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Positive Voltage Control Circuit Shorted to Control Circuit (For 8 Cylinder Engines)	P124D	This DTC detects a shorted load on Injector 6	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Positive Voltage Control Circuit Shorted to Control Circuit (For 8 Cylinder Engines)	P124E	This DTC detects a shorted load on Injector 7	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Positive Voltage Control Circuit Shorted to Control Circuit (For 8 Cylinder Engines)	P124F	This DTC detects a shorted load on Injector 8	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 electrical resistance rationality check	P1307	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 1 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.50	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; 3.00 VeGLOD_b_RunCrankVoltRec = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 electrical resistance rationality check	P1308	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 2 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.50	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; 3.00 VeGLOD_b_RunCrankVoltRec= FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 electrical resistance rationality check	P1309	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 3 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.50	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; 3.00 VeGLOD_b_RunCrankVoltRec = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 electrical resistance rationality check	P130A	Test aim is to detect when individual glow plug no longer operates within the manufacturer’s specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.20 < NaGLOD_R_GlowPlug < 2.50	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; 3.00 VeGLOD_b_RunCrankVoltRec = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Control Circuit Shorted	P1407	This monitor checks if the HP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Motor Overtemperature	P1424	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	96.00 fail counts out of 120.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Motor Overtemperature	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	== 1.00	96.00 fail counts out of 120.00 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]		

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Control Module Temperature Signal Message Counter Incorrect	P1436	This diagnosis detects a soot sensor control unit failure	Soot Sensor Control Unit Information Alive Rolling Counter OR Soot Sensor Control Unit Information Checksum is failing		Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine not in cranking mode Fault not detected on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0)	Time counter: 30.00 failures out of 50.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too Low DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P144E	DPF Control Temperature Deviation diagnostic monitorsthe exhaust gas temperature Downstream the 1st ccDOC (EGT2) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic	**LowTemperature monitoring (Positive Deviation):** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	> 100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on DOC downstream temperature sensor Combustion mode different from LNT Desox Lean and LNT Engine Protection Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	1.00 [Boolean] DPF_DPF_St== Warm_Up EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF _TempDeviation** [Boolean] > 3.00 [kph]	850.00 fail samples out of 1,000.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						< 120.00 [g/s]		
					Vehicle speed	> 8.00 [g/s]		
					Exhaust mass flow AND	< 100.00 [g/s]		
						< 30.00 [sec]		
					Exhaust mass flow			
						> 20.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)			
					The system shall not be in cut off for a calibratable timer.			
					All the above enabling conditions met for at least a calibratable timer			
			Low Temperature monitoring (Positive Deviation):		Test shall be enabled by calibratable flag	1.00 [Boolean]	850.00 fail samples out of 1,000.00 samples	
						DPF_DPF_St== Steady state		
			Temperature ccDOC Downstream control	> 100.00 degC	Regeneration state in			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			setpoint - ccDOC Downstream sensor reading (EGT2)		Steday state DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on ccDOC Downstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Vehicle speed Exhaust mass flow AND	EGT_DsblCL == Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrCatDwnFlt [Boolean] **EnginePointEnable_DPF_TempDeviation** [Boolean] > 3.00 [kph] < 120.00 [g/s] > 8.00 [g/s] < 100.00 [g/s] < 30.00 [sec]	Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow	> 15.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)			
					The system shall not be in cut off for a calibratable time			
					All the above enabling conditions met for at least a calibratable timer			

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Sensitivity Factor Performance	P1479	This diagnosis detects a soot sensor memory corruption	Soot sensor sensitivity factor is	< -0.25 OR > 0.25	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFault) NOT(P24D0)	Time counter: 30.00 failures out of 60.00 samples 1000 ms/sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Protection Tube Performance	P1488	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	Integrated derivative of corrected volumetric flow AND Integrated derivative of effective soot sensor heater voltage (i,e, cumulated heater voltage change)	> 3,000.00 < 4.33 V	Key is turned on		No debounce time	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Engine in running mode			
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	(U02A3)		
					No Soot Sensor supply undervoltage detected	NOT(P24D0)		
					No electrical fault detected on Soot Sensor	NOT(SOT_EleclFault)		
					No fault on exhaust gas pressure estimation at sensor location	SOT_ExhPresSootSnsrVld		
					No fault on exhaust gas temperature estimation at sensor location	SOT_ExhTempSootSnsrVld		
					No fault on gas mass flow estimation at sensor location	SOT_TotExhSootSnsrVld		
					Soot Sensor in protection heating operating state			
					Derivative in volumetric flow is	1.00 < d2V < 300.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for a time	> = 2.00 s		
					At InitCntrlr time since engine off	> 28,800.00 s		
					At InitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop is	> 12.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off) is	> 28,800.00 s		
					Exhaust gas temperature at Soot Sensor	0.00 < T < 300.00 °C		
					Environmental pressure	> 74.00 kPa		
					Diagnostic has not yet reported a pass or failure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug Positive Voltage Circuit	P161E	This DTC checks the circuit for electrical integrity during operation. Glow plugs supply pin open circuit or shorted to ground.	Voltage feedback under a calibratable threshold	Voltage_feedback < 6.00	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_On interface is true; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeGLOO_b_GlowPlugEnbld = TRUE; VeDRER_DiagSystemDsbl = FALSE;	5.00 fail samples over 10.00 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 Supply Circuit (Single and Two stage VGT DC Motor)	P169E	This monitor checks if the VGT DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit B Low (SENT position sensor)	P16B0	This monitor checks if the VGT SENT position sensor protocol is out of range low	HWIO counter of valid VGT SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO VGT SENT position protocol status	> 2.50 [s] AND == LOW	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication Circuit B High (SENT position sensor)	P16B1	This monitor checks if the VGT SENT position sensor protocol is out of range high	HWIO time counter since last valid VGT SENT position was transmitted > threshold (age error = TRUE) AND HWIO VGT SENT position protocol status	> 2.50 [s] AND == HIGH	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor/ Switch Communication on Circuit B Performance (SENT position sensor)	P16B2	This monitor checks if the VGT SENT position sensor protocol has performance problems	HWIO message fault on VGTSENT position == TRUE OR (number of VGT SENT position counters has been updated AND HWIO time counter since last valid VGTSENT position was transmitted > threshold (age error = TRUE))	message error == TRUE OR (----------- AND > 2.50 [s])	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range	== 1.00 > 11.00 [V] VGT_SENT_OOR_Flt == FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type 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 Current Range/ Performance (Single and Two stage VGT DC Motor)	P16FA	This monitor checks if an excessive current flows through the VGT DC-Motor (e.g. shunt circuit between load, VGTDC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Motor Overtemperature (Single and Two stage VGT DC Motor)	P16FC	This monitor checks if the temperature of the VGT DC-Motor increases too much (e.g. VGT DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Efficiency Below Threshold Bank 1	P2002	This diagnosis detects a cracked Diesel Particulate FIlter	{The level of soot calculated by a prediction model is for certain time OR soot sensor current is for certain time} AND predicted soot sensor level averaged over a number of different diagnostic runs (>= 1 runs) is	>= 1.30 (0= no soot) > 1.00 s >= 12.00 µA >= 1.00 s < 1.30	Test enabled by calibration (TRUE--> enable FALSE --> disable) Ignition voltage in range for a time Engine running or engine cranking or in auto-stop phase No faults on soot sensor DPF soot loading (ranked model) Engine out soot model realiable Note: the not reliability shall be verified for 1 s before to be declared No faults on downstream DPF temperature sensor or model No faults on downstream DPF mass airflow No faults on engine out soot model Ambient temperature During sensor measurement phase, Number of Autostop events During sensor	1.00 > 5.00 s NOT (SOT_SootSnsrFlt) > -1.00 % NOT (EXM_PM_TurbFlowNotRl b) NOT (DPF_TempDPF_DwnFlt) SOT_TotExhSootSnsrVld NOT (SOT_PM_DPF_UpFlt) > -7.00 °C < 20.00	The number of runs to perform the diagnostic test >= 1.00	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Over Temperature Bank (DOC1_SCR_DOC2_DPF)(EGT5)	P200C	This diagnosis verify if the exahust gas temperature on DPF Downstream (EGT_DPF_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Downstream Exhaust gas temperature	***In Regeneration mode:*** > 850.00 [°C] **In Normal mode:** > 850.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on DPF Downstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	**In Normal mode:** 150.00 fail samples out of 188.00 samples **In Regeneration mode:** 150.00 fail samples out of 188.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: DPF Downstream Exhaust gas temperature	> 900.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	150.00 fail samples out of 188.00 samples Function task: 100ms	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Over Temperature Bank 1 (DOC1_SCR_DOC2_DPF) (EGT2)	P200E	This diagnosis verify if the exahust gas temperature on ccDOC Downstream (EGT_DOC1_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** Exhaust gas temperature on ccDOC Downstream	**In Regeneration mode:** > 850.00 [°C] **In Normal mode:** > 850.00 [°C]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream Temperature sensor (EGT2)	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	**In Normal mode:** 100.00 fail samples out of 125.00 samples **In Regeneration mode :** 100.00 fail samples out of 125.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: Exhaust gas temperature on ccDOC Downstream	> 900.00	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	100.00 fail samples out of 125.00 samples Function task: 100ms	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 2	P2032	Controller specific output driver circuit diagnoses t the exhaust gas temperature 2 (EGT2) sensor signal high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 160.00 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 2	P2033	Controller specific output driver circuit diagnoses the exhaust gas temperature 2 (EGT2) signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the exhaust gas temperature 2 (EGT2) signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 900.00 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF tank heater plausibility check	P20BA	This diagnosis verify thet the DEF tank heater resistance value is not plausible	DEF tank heater resistance not plausible (too different from the nominal one) DEF tank heater resistance outside the range	(1.05 ; 1.93) [ohm]	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No SCR Power Module CAN loss of communication No electrical faults affecting the tank heater Heating strategy is requesting the Heater to be activated Time passed since heater activation > threshold Tank heater supply under-voltage fault not present	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFTH_ElecFltSt == FALSE > 1.00 [s] SCR_TankHeatSplyVoltFA == FALSE	16.00 failures out of 20.00 samples Time basis = 500ms	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF line heater plausibility check	P20BE	This diagnosis verify thet the DEF line heater resistance value is not plausible	DEF line heater resistance value not plausible (too different from the nominal one)	(Heater supply voltage/ Heater Current) > 3.66 OR (Heater supply voltage/ Heater Current) < 1.74	Test enabled by calibration Battery voltage Key on (OR engine running) Engine is not cranking No loss of CAN comunication No electrical faults affecting the line heater Heating strategy is requesting the Heater to be activated Time since heater activation > threshold Line heater supply under-voltage fault not present	1.00 > 11.00 [V] U010E, Lost Communication With Reductant Control Module (SCR) SCR_DEFLH_ElecFltSt ==FALSE VeSCRR_b_HeatB_On == TRUE > 1.00 SCR_LineHeatSplyVoltFA == FALSE	16.00 failures out of 20.00 samples Time basis = 500ms	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector A Control Circuit/Open	P20CB	This diagnosis detects a HC Injector Command pin /wire in open circuit	HC injector HWIO Open interface fault	=TRUE (i.e. If the voltage at the AUXINJ output in the OFF state stays below Volt (1.95 to 2.175V) and Volt (2.9 V to 3.2 V) for a time longer than tdiag (40µs to 70µs)	Test Enabled by calibration Shared High Side Driver 2 commanded ON (i.e. closed) Powertrain relay voltage in range;	1.00	48.00 failures over 60.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector A Control Circuit Low	P20CD	This diagnosis detects a HC Injector Command pin /wire shortcut to ground	HC injector HWIO Short To Ground interface fault	=TRUE (i.e If the voltage at the AUXINJ output in the OFF state stays below Vltvt (1,95V to 2,175V) for a time longer than tdiag (40µs to 70µs)	Shared High Side Driver 2 commanded ON (i.e. closed) Powertrain relay voltage in range;		10.00 failures over 30.00 samples 100 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector A Control Circuit High	P20CE	This diagnosis detects a HC Injector Command pin /wire shortcut to power supply	HC injector HWIO Short To Power Supply interface fault	=TRUE (i.e. If the current through the AUXINJ output in the ON state is higher than Ioc1 (8A to 11A) for a time longer than toc1 = 36µs OR If the current through the AUXINJ output in ON state is higher than Ioc2 (16 A to 22A)	Powertrain relay voltage in range;		48.00 failures over 60.00 100 ms/samples	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 1 Low Voltage (For 4 Cylinder Engines)	P2147	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage high across High Side Driver of bank 1 (injector 1 and 4) during On state indicates short to ground	impedence between HS pin of injector 1 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderA OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 1 High Voltage (For 4 Cylinder Engines)	P2148	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage low across High side drive of bank 1 (injector 1 and 4) during off state indicates short to power	impedence between HS pin of injector 1 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderA OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2 Low Voltage (For 4 Cylinder Engines)	P2150	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 2 (injector 2 and 3)	Voltage high across High Side Driver of bank 2 (injector 2 and 3) 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 3 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 OR FUL_OutEnblCyl_CiEPSR_CylinderB) and (FUL_FuelInjectedCyl_CiEPSR_CylinderD OR FUL_FuelInjectedCyl_CiEPSR_CylinderB)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2 High Voltage (For 4 Cylinder Engines)	P2151	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 2 (injector 2 and 3)	Voltage low across High side drive of bank 2 (injector 2 and 3) 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 3 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 OR FUL_OutEnblCyl_CiEPSR_CylinderB) and (FUL_FuelInjectedCyl_CiEPSR_CylinderD OR FUL_FuelInjectedCyl_CiEPSR_CylinderB)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 3 Low Voltage (For 8 Cylinder Engines)	P2153	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage high across High Side Driver of bank 3 (injector 6 and 7) during On state indicates short to ground	impedence between HS pin of injector 6 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderG OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 3 High Voltage (For 8 Cylinder Engines)	P2154	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage low across High side drive of bank 3 (injector 6 and 7) during off state indicates short to power	impedence between HS pin of injector 6 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderG OR FUL_OutEnblCyl_CiEPSR_CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR_CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 4 Low Voltage (For 8 Cylinder Engines)	P2156	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage high across High Side Driver of bank 4 (injector 3 and 8) during On state indicates short to ground	impedence between HS pin of injector 3 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderH OR FUL_OutEnblCyl_CiEPSR_CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR_CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 4 High Voltage (For 8 Cylinder Engines)	P2157	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage low across High side drive of bank 4 (injector 3 and 8) during off state indicates short to power	impedence between HS pin of injector 3 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR_CylinderH OR FUL_OutEnblCyl_CiEPSR_CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR_CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1 Sensor 1	P2202	This diagnosis verifies Upstream NOx sensor read out of range low	Check if the NOx1 sensor NOx concentration raw read is out of lower range: NOx raw read	< -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag	> 10 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A > 10.80 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMinCmbMode**	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit High Bank 1 Sensor 1	P2203	This diagnosis verifies Upstream NOx sensor read out of range high	Check if the NOx1 sensor NOx concentration raw read is out of higher range: NOx raw read	 > 2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A > 10.8V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMaxCmbMode**	Time counter: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 10.8V		
					Sensor dewpoint is reached	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Control Circuit High Voltage	P2207	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8 V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit	P2208	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Sense pin (HTemp)	open circuit on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range	TRUE > 11.00 V TRUE FALSE > 10.8V	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	This diagnosis verifies if the supply voltage of the Upstream Nox sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage < 10.80 V	NOx sensor is Gen3.0	TRUE	Time counter: 240 fails out of 480 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	> 30 sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	This diagnosis verifies if the supply voltage of the Downstream Nox sensor is out of range	Check if NOxSensor 2 supply voltage status is out of range	Sensor supply voltage < 10.80 V	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON a) NOx sensor Dewpoint is reached b) condition a) shall be fulfilled for time CAN_LostComm_FltN_BusB_NOxSnsr_B	TRUE > 11.00 V TRUE TRUE > 30 sec FALSE	Time counter: 240 fails out of 480 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 1 Heater Sense Circuit Low Voltage	P2210	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 Heater Sense pin (HTemp)	groundshort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2297	This DTC aims to detect a drift of measured O2 value (A) from an estimated concentration (B) when the latter can be considered stable during fuel cut-off condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 3.50 [%] < -1.50 [%]	Engine running		Once per trip Note: if EWMA Fast Initial Response is active OR EWMA Rapid Response is active than multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_NOx1_O2_RawNotRlb == FALSE		
					No SQA learning is active	FAD_SQA_LrnET_Enbl == FALSE		
					Enabled in combustion mode	refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**)		
					No Exhaust Brake active i.e. intake manifold pressure	< 1,000.00 [kPa]		
					No pending or confirmed DTCs	NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdlFlt OXY_NOx1SignRngChkFlt FHP_InjLeakageFA EGR_PstnShtOffReqFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) (MAP_SensorFA AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 3.00 [s]		
					a. Engine speed in operating range	> 1,000 [rpm] < 3,000 [rpm]		
					b. EGR position	< 10.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 500.00 [mg] < 1,500.00 [mg]		
					Estimated O2 concentration stable i.e. difference between initial and actual value	< 0.50 [%]		
					Air mass flown since fuel cut-off condition	> 20.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Downstream NOx sensor read out of range low	Check if the NOx2 sensor NOx concentration raw read is out of lower range: NOx raw read	 < -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 sensor No electrical failure on NOx2 sensor Combustion mode dependent enabling flag	> 10 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 10.8V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMinCmbMode**	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	This diagnosis verifies Downstream NOx sensor read out of range high	Check if the NOx1 sensor NOx concentration raw read is out of higher range: NOx raw read	 > 2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 sensor No electrical failure on NOx2 sensor Combustion mode dependent enabling flag	> 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 10.8V TRUE NOX_NOx2_StBitChkFlt ==FALSE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMaxCmbMode**	Time counter: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit	P22A3	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Supply pin (H+)	open circuit on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range	TRUE > 11.00 V TRUE FALSE > 10.8V	Time counter: 20 fails out of 40 samples Task=25ms	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense Circuit	P22A6	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Sense pin (HTemp)	open circuit on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range	TRUE > 11.00 V TRUE FALSE > 10.8V	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor 2 Heater Sense High Voltage	P22A9	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached	TRUE > 11.00 V TRUE FALSE > 10.8V TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 2	P22B7	This DTC detects if O2 signal is higher than physical maximum value.	O2 signal higher than a maximum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	> 11.00 [V] OXY_NOx2_O2_RawNotRlb == FALSE < 300.00 [kPa] < 299.00 [kPa] NOX_Snsr2_NotVld NOX_Snsr2_PresFlt (MAP_SensorFA AND MAP_SensorTFTKO)	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	P22FE	This diagnosis verifies the Downstream NOx sensor sensing cells integrity during afterrun	Check if there is any clogging in the Downstream NOx sensor measurement cavities that could result in reduced NOx-sensitivity. The sensor internal operating current set-points are changed such way, that the O2 concentration in 2nd sensor cavity is around 1000ppm. One test result is measured in fresh sensor state (at supplier plant) and stored in the sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	> 150 % OR < 50 %	No electrical failure on NOx2 sensor No out of range low failure on NOx2 sensor No out of range high failure on NOx2 sensor No failure on NOx2 CAN communication No electrical failure on NOx1 sensor No failure on O2 from NOx1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on crank sensor No failure on exhaust temperature sensor (downstream SCR) No failure on HC injector No failure on Vehicle Speed sensor	NOX_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLoFlt ==FALSE NOX_NOx2_OutOfRngHiFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE NOX_Snsr1_ElecFA ==FALSE OXY_NOx1_O2_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE CrankSensor_FA ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Fast Initial Response EWMA is active then 4 test per trip are allowed	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No failure on NOx2 dynamic check	NOX_NOx2_DynChkFlt ==FALSE		
					No failure on any input of SCR chemical model	SCR_ChemicalMdlFlt ==FALSE		
					No current control failure on NOx2 sensor	NOX_NOx2_StBitChkFlt ==FALSE		
					Powertrain relay voltage	> 11.00 V		
					NOx2 sensor supply in range	> 10.8V		
					NOx2 sensor dewpoint is reached	TRUE		
					(NOx2 Sensor heater raw resistance - NOx2 sensor heater target resistance) / NOx2 sensor heater target resistence	< 0.03 % >- 0.03 %		
					a)combustion mode dependent enabling flag	**NOX_NOx2SelfTstEnblCmbMode**		
					b) condition a) is fulfilled for time	> 60 sec		
					c) engine speed	> 0 rpm < 1,500 rpm		
					d) condition c) is fulfilled for time	> 1 sec		
					e) After injection pulse is not used for time	> 60 sec		
					f) exhaust temperature sensor (downstream SCR)	> -7 °C < 400 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					g) exhaust mass flow	< 20 g/s		
					h) NH3 concentration	< 100 ppm		
					j) conditions f) g) h) are fulfilled for time	> 5 sec		
					k) O2 concentration from NOx1	> 10 %		
					i) NOx concentration from NOx1	< 400 ppm		
					l) conditions k) i) are fulfilled for time	> 1 sec		
					m) duty cycle applied to the HC injector driver	< 1 %		
					n) condition m) is fulfilled for time	> 5 sec		
					o) time between key off and last overrun	> 15 sec		
					p) time between key off and last DPF regen	> 15 sec		
					q) engine speed in idle range	< 1,100 rpm		
					r) fuel request in idle range	< 20 mm^3		
					s) conditions q) r) is fulfillled for time	< 1,800 sec		
					t) timer of condition s) is reset if one of the following condition is fulfilled (idle off			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					recognition - t) conditions):			
					t.1) exhaust temperature (downstream SCR)	> 200 °C		
					t.2) condition t.1) is fulfilled for time (once idle has been detected)	> 300 sec		
					t.3) vehicle speed	> 5 mph		
					t.4) condition t.3) is fulfilled for time (once idle has been detected)	> 5 sec		
					t.5) exhaust mass flow	> 20 g/sec		
					t.6) condition t.5) is fulfilled for time (once idle has been detected)	> 5 sec		
					u) HC mass flow (SCR downstream)	< 250 g/s		
					Once u) condition is fulfilled the following additional u.x) conditions shall be fulfilled to enable the monitor (AND logic)			
					u.1) exhaust temperature (downstream SCR)	> 200 g/s		
					u.2) condition u.1) is fulfilled for time (once condition u) has been detected)	> 30 sec		
					u.3) vehicle speed	> 5 mph		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 3	P242C	Controller specific output driver circuit diagnoses t the exhaust gas temperature 3 (EGT3) sensor signal high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 160.00 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 3	P242D	Controller specific output driver circuit diagnoses the exhaust gas temperature 3 (EGT3) signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the exhaust gas temperature 3 (EGT3) signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 900.00 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Differential Pressure Too Low	P244A	This diagnostic detects a DPF pressure sensor pipe disconnected or clogged or blocked or a removed Diesel Particulate Filter	measured DPF absolute pressure	< **Exhaust Gas Pressure Too Low Threshold**	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	60.00 failures over 100.00 samples function task: 100 ms	Type A, 1 Trips
					No error on relative to ambient pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrRatFlt		
					No error on upstream DPF temperature sensor (electrical and rationality)	EGT_SnsrDPF_UpFlt		
					No error on air flow meter	MAF_MAF_SnsrFA OR MAF_MAF_SnsrTFTKO		
					No error on atmospheric pressure sensor	AmbPresDfltdStatus= CeAAPR_e_AmbPresNotDfltd		
					Exhaust gas volume flow	> 65.00 l/s		
					Engine speed	> 800.00 rpm		
					(Engine coolant temperature	> 69.00 °C		
					OR	OR		
					OBD Coolant Enable Criteria)	= TRUE)		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Pressure Sensor A Circuit Range/ Performance	P2453	Case1: This diagnosis verify if the current value of the flow resistace is almost equal to the average value of the flow resistance Case2: This diagnosis verify if the pressure at the DPF inlet doesn't change when it is supposed to change (when moving from one engine operating point to another)	|Flow resistance filtered – Average flow resistance|>	> 0.02 [KPa*s/m^3]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No fault on exhaust gas pressure sensor (electrical, offset, quick change and stuck in range in and logic) and with No fault on air flow meter in and logic and with	0 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent MAF_SensorFA and with MAF_SensorTFTKO EGT_SnsrDPF_UpFA and with	30 fail samples out of 50 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on DPF Upstream temperature sensor (electrical, rationality, quick change and stuck in range in and logic) and with **System in stationary conditions:** - Fuel request and with - Engine speed and with - Air mass quantity per cylinder and with - Air mass quantity per cylinder and with - Deactivation of Flow resistance calculation	EGT_SnsrDPF_UpTFTKO <= 1.00 [mm^3] <= 10.00 [rpm] <= 10.00 [mg] > 0.00 [mg] == FALSE		
			DPF pressure variation	<= 0.80 [%]	Test enabled by calibration and with	1	7 fail samples out of 10 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine running and with No fault on exhaust gas pressure sensor (electrical, plausibility, offset and quick change in and logic) and with Engine speed variation greater and with Fuel quantity variation greater	== TRUE EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent > 900.00 [rpm/s] > 60.00 [l/s]	Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Pressure Sensor A Circuit Low	P2454	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal s high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 3.00 [%]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	160 fail samples out of 250 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Pressure Sensor A Circuit High	P2455	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	160 fail samples out of 250 samples Function task: 12.5 ms	Type B, 2 Trips
			Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	160 fail samples out of 250 samples Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Pressure Sensor A Circuit Intermittent/ Erratic	P2456	This diagnosis verify if the signal (difference between two consecutive signal samples) variation is too big	|DPF pressure raw signal - DPFpressure raw signal old|	> 20.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical fault on exhaust gas pressure sensor	1 [Boolean] == TRUE == FALSE == TRUE > 11.00 [V] EGP_DiffPresSnsrCktFlt	36 fail samples out of 240 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooling System Performance (OBDII market only) (non-MDE applications)	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).	< 68.88 [%]	Calibration on diagnostic enabling	1.00 ==TRUE	Test executed after 500.00 samples are collected and their average is computed	Type B, 2 Trips
					Diagnostic has not run in current driving cycle yet	==TRUE		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]	functional task 100 ms	
					Engine is running or cranking	==TRUE		
					HP EGR cooler upstream temperature in range	> 250.00 [°C] < 800.00 [°C]		
					Ambient Temperature	>= -7.00 [°C]		
					Ambient pressure	>= 70.00 [kPa]		
					Air Control is Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 70.00 [°C] ==TRUE < 117.00 [°C]		
					HP EGR Cooler bypass	> 5.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for a time			
					HP EGR flow in range	< 20.00 [mg/s] > 6.00 [mg/s]		
					for a time	>= 2.00 [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	< 3,000.00 [rpm] > 1,600.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		
					No fault on HP EGR cooler downstream temperature sensor	CET_DNSS_FA==FALSE		
					No fault on Ambient Temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on engine speed	CrankSensor_FA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on HP EGR Cooler Bypass	CEB_ActrCktLoFA ==FALSE		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Low (ECB Vacuum)	P245C	This monitor checks if the HP EGR cooler bypass valve command is shorted to ground	Resistance to ground lower than a threshold (error information provided by HWIO)	< 0.5 [Ohm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Flap is requested in COOLING mode Shared High Side driver driven closed	== 1.00 > 11.00 [V]	24.00 fail counts out of 30.00 sample counts Function task: 100 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Filter Soot Accumulation	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	Filtered flow resistance (DPF_ResistFlowFltd)	> **Flow Resistance High Threshold**	Test enabled by calibration (TRUE--> enable FALSE --> disable)	1.00	1,600.00 failures over 1,800.00 samples function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt		
					No fault on upstream DPF temperature sensor (electrical and rationality)	EGT_SnsrDPF_UpFlt		
					No fault on air flow meter	MAF_MAF_SnsrFAOR MAF_MAF_SnsrTFTKO		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					DPF status insootloading phase (no regeneration ongoing)	DPF_DPF_St== CeDPFR_e_SootLoading		
					Engine speed	> 800.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA		
					Flow Resistance calculation enable	DPF_ResistFlowCalcOff == False		
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 25.00 [l/s] for > 2.00 [s]		
					Soot trapped in the DPF	> -1.00 [Pct]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	100.00 [DegC] < Temperature < 400.00 [DegC] for > 0.00 [s]		
					Engine Coolant Temperature	> 40.00 [DegC]		
					Ambient Temperature	> -40.00 [DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P2470	Controller specific output driver circuit diagnoses t the exhaust gas temperature 4 (EGT4) sensor signal high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 160 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P2471	Controller specific output driver circuit diagnoses the exhaust gas temperature 4 (EGT4) signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the exhaust gas temperature 4 (EGT4) signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips
			Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Intermittent/ Erratic Bank 1 Sensor 4 DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P2472	This diagnosis verify if the EGT4 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT4output reistance - EGT4 output resistance old|	> 10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with Battery voltage and with key on and with No electrical faults on EGT1sensorin and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas4_TFTKO and with EGT_ExhGas4_FA	20 fail samples out of 40 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 5 DOC1+SCR +DOC2 +DPF	P2481	Controller specific output driver circuit diagnoses t the exhaust gas temperature 5 (EGT5) sensor signal high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 160 [Ohm]	Test enabled by calibration (TRUE--> enable FALSE --> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 5 DOC1+SCR +DOC2 +DPF	P2482	Controller specific output driver circuit diagnoses the exhaust gas temperature 5 (EGT5) signal high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Controller specific output driver circuit diagnoses the exhaust gas temperature 5 (EGT5) signal high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips
			Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature Sensor Circuit Intermittent/ Erratic Bank 1 Sensor 5 DOC1+SCR +DOC2 +DPF	P2484	This diagnosis verify if the EGT5 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT5 output reistance - EGT5 output resistance old|	< 10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with Battery voltage and with key on and with No electrical faults on EGT1sensorin and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas5_TFTKO and with EGT_ExhGas5_FA	20 fail samples out of 40 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DEF tank heater supply undervoltage monitoring	P248A	This diagnosis verifues that the tank heater supply voltage is under the threshold of correct functioning	Tank heater supply under-voltage (System Battery voltage - Tank heater Supply Voltage value)	 > 3.00	Test enabled by calibration Powertrain relay in range Run Crank Active Cranking phase excluded No SCR Power Module CAN loss of communication Heating strategy is requesting the Heater to be activated	1.00 U010E, Lost Communication With Reductant Control Module (SCR) VeSCRR_b_HeatA_On == TRUE	16.00 failures out of 20.00 samples Time basis = 500ms	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop DPF Regeneration Control At Limit - Temperature Too Low DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P24A0	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF (EGT4) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring is divided into 2 logics, in particular the DPF warm up state logic, that has only the Positive deviation monitoring, and the DPF steady state logic, that has both deviation monitoring.	**Low Temperature monitoring (Positive Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on DPF upstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Vehicle speed Exhaust mass flow AND	1.00 [Boolean] DPF_DPF_St == Warm_Up EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] > 3.00 [kph] < 120.00 [g/s] > 8.00 [g/s] < 100.00 [g/s]	1,200.00 fail samples out of 1,500.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust mass flow Filtered Exhaust mass flow variation (absolute value) The system shall not be in cut off for a calibratable timer. All the above enabling conditions met for at least a calibratable timer	< 30.00 [sec] > 10.00 [sec]		
			Low Temperature monitoring (Positive Deviation): Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 100.00 degC	Test shall be enabled by calibratable flag Regeneration state in Steady state DPF Mode HCI temperature closed loop control shall be enabled Battery voltage	1.00 [Boolean] DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean]	1,200.00 fail samples out of 1,500.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No fault on exhaust mass flow	VehicleSpeedSensor_FA [Boolean]		
					No fault on vehicle speed	EGT_SnsrDPF_UpFlt [Boolean]		
					No Fault on DPF upstream temperature sensor	**EnginePointEnable_HC_TempDeviation** [Boolean]		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	> 3.00 [kph]		
					Vehicle speed	< 120.00 [g/s]		
						> 8.00 [g/s]		
					Exhaust mass flow AND Exhaust mass flow	< 100.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 30.00 [sec]		
					The system shall not be in cut off for a calibratable timer.	> 10.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Closed Loop DPF Regeneration Control At Limit - Temperature Too High DOC+DPF +SCR, DOC1+SCR +DOC2 +DPF	P24A1	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF (EGT4) to determine whether the temperature deviation between the control setpoint and the temperature read by the sensoris within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring runs only in DPF steady state logic	**High Temperature monitoring (Negative Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	< -100.00 degC	Test shall be enabled by calibratable flag Regen eration state in Steady state DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No fault on vehicle speed No Fault on DPF upstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Vehicle speed Exhaust mass flow AND	1.00 [Boolean] DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] VehicleSpeedSensor_FA [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] > 3.00 [kph] < 120.00 [g/s] > 8.00 [g/s] < 100.00 [g/s] < 30.00 [sec]	1,200.00 fail samples out of 1,500.00 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Stuck (ECB Vacuum)	P24A5	This monitor check if the EGR Cooler Bypass is mechanically stuck in bypass or cooling mode	Gradient temperature downstream EGR cooler bypass when the EGR cooler bypass flap is moved from cooling to bypass and from bypass to cooling position < low threshold	< **P24A5: Gradient Temperature Threshold** [°C]	Diagnosis is enabled by a calibration	== 1.00	Test is executed after 5.00 + 5.00 + 5.00 sample counts Function task: 100 ms	Type B, 2 Trips
					Engine speed	>= 680.00 [rpm] < 950.00 [rpm]		
					Vehicle speed	< 2.00 [kph]		
					EGR valve total flow	>= 2.25 [mg/s] < 100.00 [mg/s]		
					Air Control Active	AIC_AirCntrlShtOffAction ==Ce_AICR_e_CntrlActv		
					Engine Coolant Temperature	>= 70.00 [°C] < 117.00 [°C]		
					Combustion Mode	==C2,C3, SCR_Temp1,SCR_Temp, SCR_Temp3		
					Fuel value	>= 10.00 [mm^3] < 40.00 [mm^3]		
					Fuel gradient	>= -100.00 [mm^3] < 100.00 [mm^3]		
					Gradient filtered downstream EGR cooler temperature, with hysteresis	< 1.50 [°C/s] (ENABLE) > 2.50 [°C/s] (DISABLE)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EGR upstream temperature	>= 200.00 [°C] < 800.00 [°C]		
					Outside air temperature	>= -7.00 [°C]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA=FALSE		
					No faults detected on downstream HP EGR Cooler temperature sensor	CET_DNSS_FA==FALSE		
					No faults detected on upstream HP EGR Cooler temperature sensor	CET_UPSS_FA==FALSE		
					No faults detected on HP EGR Cooler Bypass actuator	CEB_ActrCktFA==FALSE		
					No faults detected on HP EGR valve	EGR_PstnDvtnFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Sensor Electrode raw current 1 AND Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	< 2.00 A < 0.09 A	Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Fault not active on undervoltage for Soot Sensor Control Unit supply No Electrical faults present on Soot Sensor Soot Sensor is in regeneration phase Soot Sensor temperature Soot Sensor Electrode current measurement enabled	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_EleclFault) 560.00 < T < 800.00 °C	No time debounce	Type B, 2 Trips

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Particulate Matter Sensor Temperature Circuit Performance	P24C7	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit.	The absolute value of the difference between the Soot Sensor Electrode and the electrode temperature model	> 100.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor Soot Sensor heater is not commanded Soot Sensor is in measurement operating status Exhaust gas temperature model is valid	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24D0) NOT(SOT_EleclFault) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd	Time counter: 200.00 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	> 55.00 kPa		
					Ambient air temperature	> -20.00 °C		
					Exhaust gas volumetric flow at soot sensor	> 50.00 mg/s		
					Time after sensor regeneration	> 300.00 s		
					Soot Sensor Dew Point has been reached)			

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position Sensor Circuit Low (SENT position sensor)	P2564	This monitor checks if the VGT SENT position sensor is out of electrical range low	SENTposition raw voltage < low threshold	< 3.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range and SENT performance	== 1.00 > 11.00 [V] VGT_SENT_OOR_Flt ==FALSE VGT_SENT_PerfFlt ==FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Position Sensor Circuit High (SENT position sensor)	P2565	This monitor checks if the VGT SENT position sensor is out of electrical range high	SENTposition raw voltage > high threshold	> 97.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range and SENT performance	== 1.00 > 11.00 [V] VGT_SENT_OOR_Flt ==FALSE VGT_SENT_PerfFlt ==FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Stuck Open (Single and Two stage VGT DC Motor)	P2598	This monitor checks if the VGT vanes got mechanically stuck in a position more open than what is required by the control	position tracking error (setpoint position - measured position) > positive threshold	> **P2598: Positive Position Tracking Error Threshold** [%]	Test enabled by calibration	== 1.00	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Position control in closed loop (no faults present on VGT position sensor, VGT vanes, position deviation)	VGT_PstnSnsrFA== FALSE VGT_ActCktFA == FALSE VGT_PstnCntrlFA == FALSE		
					Position setpoint is in steady state conditions	< 40.00 [%/s] > -40.00 [%/s]		
					Engine speed > threshold	> 1,500.00 [rpm]		
					Engine coolant temperature > threshold	> -7.00 [°C]		
					Intake manifold temperature > threshold	> -7.00 [°C]		
					All previous conditions must be verified for a minimum calibratable time	> 0.50 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Stuck Closed (Single and Two stage VGT DC Motor)	P2599	This monitor checks if the VGT vanes got mechanically stuck in a position more closed than what is required by the control	position tracking error (setpoint position - measured position) < negative threshold	< **P2599: Negative Position Tracking Error Threshold** [%]	Test enabled by calibration	== 1.00	640.00 fail counts out of 800.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Position control in closed loop (no faults present on VGT position sensor, VGTvanes, position deviation)	VGT_PstnSnsrFA== FALSE VGT_ActCktFA == FALSE VGT_PstnCntrlFA == FALSE		
					Position setpoint is in steady state conditions	< 40.00 [%/s] > -40.00 [%/s]		
					Engine speed > threshold	> 1,500.00 [rpm]		
					Engine coolant temperature > threshold	> -7.00 [°C]		
					Intake manifold temperature > threshold	> -7.00 [°C]		
					All previous conditions must be verified for a minimum calibratable time	> 0.50 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 1	P2627	This DTC detects if O2 signal is lower than physical minimum value or a Trim Resistance pin open load.	O2 signal lower than a minimum value	< -4.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE refer to supporting table **KaOXYD_b_NOx1SigRn** (**gEnblCmbMode**) NOX_Snsr1_NotVld	Time counter: 200 failures out of 250 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 1	P2628	This DTC detects if O2 signal is higher than physical maximum value or a Trim Resistance pin open load.	O2 signal higher than a maximum value	> 27.00 [%]	Engine running		Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_NOx1_O2_RawNotRlb == FALSE		
					Exhaust gas pressure	< 300.00 [kPa]		
					No Exhaust Brake active i.e. intake manifold pressure	< 1,000.00 [kPa]		
					No pending or confirmed DTCs	NOX_Snsr1_NotVld NOX_Snsr1_PresFlt (MAP_SensorFA AND MAP_SensorTFTKO)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injector Data Incompatible	P268C	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 1 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 1 EIA code not written via DID (DID $60).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injector Data Incompatible	P268D	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 2 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 2 EIA code not written via DID (DID $61).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injector Data Incompatible	P268E	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 3 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 3 EIA code not written via DID (DID $62).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injector Data Incompatible	P268F	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 4 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 4 EIA code not written via DID (DID $63).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injector Data Incompatible	P2690	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 5 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 5 EIA code not written via DID (DID $64).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC aims to detect a drift of measured O2 value (A) from an estimated concentration (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 2.85 [%] < -2.15 [%]	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 Stable fuel cut-off condition has been reached i.e. following	> 11.00 [V] OXY_NOx1_O2_RawNotRlb == FALSE refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**) 1 [boolean] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFlt FHP_InjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowNotValid	Once per trip Note: if EWMA Fast Initial Response is active OR EWMA Rapid Response is active than multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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] > 1,650 [rpm] < 2,250 [rpm] < 1,000.00 [mg] > 40.00 [mm^3] < 80.00 [mm^3] > 500.00 [mg] < 1,500.00 [mg] < 0.50 [%] > 20.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Range/ Performance Bank 1 Sensor 2	P2A01	This DTC aims to detect a drift of Sensor 2 O2 measured value (A) from Sensor 1 O2 measured value (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 1.40 [%] < -1.70 [%]	Engine running		EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRlb == FALSE		
					Sensor 1 is fully operative	OXY_O2_NOx1_PresCmpNotRlb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO)		
					DTC P2A00 is running	(see P2A00 Fault code)		
					Air mass flown since P2A00 is enabled	> 45.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Delivery Performance - Hydrualic Monitoring	P2BAA	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery.	**Non-EWMA** Measured DEF pressure drop after the injection has been performed is lower than the expected pressure drop. The expected pressure drop depends on the motorpump efficiency (that is estimated based on the average commanded duty cycle). Measured DEF pressure drop **EWMA**	 < **P2BAA RDP Min Press Drop** table	Test enabled by calibration (TRUE->Enable False -> Disable) Diag System Disable Ambient Air Temperature (degC) Barometric Pressure (kPa) DEF Injector Component Management Ready DEF Injector Cooling Request DPF Regeneration Active DEF Injector Temperature (degC) DEF Injector Temperature (degC) Gradient temperature of DEF Injector (degC) within a time period of (ms) Integrated DEF Injected Mass (mg) Integrated DEF Injected Mass (mg) Integrated Upstream NOx Flow (mg)	1.00 == FALSE > -20.00 > 70.00 == TRUE == FALSE == FALSE > 225.00 < 500.00 < 3.00 = 100ms * 100.00 > 7,000.00 < 10,000,000.00 >= 3,000.00	Function Task: 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Upstream SCR Exhaust Flow (g/s)	> 8.00		
					DEF System Hydraulic System Shutoff	== FALSE		
					No DEF Mass Flow less than calibratable mass (mg/s) for calibratable time (ms).	< 100.00 >= 100ms * 10.00		
					DEF Tank Status	== NOT FROZEN		
					Upstream DEF Injector Temperature Signal Fault	== FALSE		
					Outside Air Temperature Signal Fault	[OAT_PtEstFiltFA or OAT_OAT_SnsrNonEmissFA] == FALSE		
					Upstream SCR Exhaust Flow Signal Fault	EXF_TotExhSCR_UpFlt == FALSE		
					Barometric Pressure Signal Fault	AAP_AmbientAirPresDfltd == FALSE		
					Upstream NOx Sensor Concentration Signal Fault	== FALSE		
					Vehicle Speed Signal Fault	VehicleSpeedSensor_FA == FALSE		
					Vehicle Speed below calibratable threshold (kph) for calibratable time (ms).	<= 0.00 >= 100ms * 30.00		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Performance (VGT Smart)	P0046	This monitor checks if the VGT vanes got mechanically stuck in any positions	absolute value of position tracking error (setpoint position - measured position) > positive threshold	> 16.00 [%]	Test enabled by calibration	== 1.00	320.00 fail count out of 400.00 sample counts Function task: 25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Position control in closed loop (no faults present on VGT position sensor, VGT vanes, position deviation)	CFM_VGT_CommFA == FALSE VGT_SmartActrFA == FALSE VGT_PstnSnsrOfstFA == FALSE		
					Position setpoint is in steady state conditions for a certain time	< 100.00 [%/s] > -100.00 [%/s] for 0.50 [s]		
					Engine coolant temperature > threshold	> -60.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA == FALSE		
					Outside air temperature > threshold	> -60.00 [°C]		
					No faults present on	OAT_PtEstFiltFA		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Module Performance (VGT Smart)	P00AF	This monitor checks if the smart VGT has an internal fault	Smart actuator internal fault: Pattern Error, Overcurrent Error, Checksum Error (error information provided by the actuator)		Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No fault validated on smart VGT rolling counters	== 1.00 > 11.00 [V] CFM_VGT_CommFA == FALSE	8.00 fail counts out of 10.00 sample counts Function task: 500 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing Perfomance - Over Retarded	P01CB	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Timing Perfomance - Over Advanced	P01CC	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing Perfomance - Over Retarded	P01CD	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active AND Boolean Flag used to disable SQA in case of power take off active	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Timing Perfomance - Over Advanced	P01CE	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing Perfomance - Over Retarded	P01CF	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Timing Perfomance - Over Advanced	P01D0	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing Perfomance - Over Retarded	P01D1	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Injection Timing Perfomance - Over Advanced	P01D2	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing Perfomance - Over Retarded	P01D3	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing Perfomance - Over Advanced	P01D4	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing Perfomance - Over Retarded	P01D5	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing Perfomance - Over Advanced	P01D6	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing Perfomance - Over Retarded	P01D7	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing Perfomance - Over Advanced	P01D8	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing Perfomance - Over Retarded	P01D9	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] > 80.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing Perfomance - Over Advanced	P01DA	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	 < 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE (x)SQA injection management enabled	1.00 1.00 >= 72.00 [kPa] >= -7.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Open Circuit (For 8 Cylinder Engines)	P0205	This DTC checks the Injector 5 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Open Circuit (For 8 Cylinder Engines)	P0206	This DTC checks the Injector 6 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Open Circuit (For 8 Cylinder Engines)	P0207	This DTC checks the Injector 7 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Open Circuit (For 8 Cylinder Engines)	P0208	This DTC checks the Injector 8 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Timing (For 8 Cylinder Engines)	P020E	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 5 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Timing (For 8 Cylinder Engines)	P020F	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 6 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderG and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Timing (For 8 Cylinder Engines)	P021A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 7 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 7 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Timing (For 8 Cylinder Engines)	P021B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 8 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 8 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_InjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Control Circuit Low Voltage (For 8 Cylinder Engines)	P0273	This DTC detects a short circuit to ground of the low side driver circuit of Injector 5.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit Low Voltage (For 8 Cylinder Engines)	P0276	This DTC detects a short circuit to ground of the low side driver circuit of Injector 6.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Control Circuit Low Voltage (For 8 Cylinder Engines)	P0279	This DTC detects a short circuit to ground of the low side driver circuit of Injector 7.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Control Circuit Low Voltage (For 8 Cylinder Engines)	P0282	This DTC detects a short circuit to ground of the low side driver circuit of Injector 8.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Fuel Injector Offset Learning At Min Limit	P02D4	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Fuel Injector Offset Learning At Max Limit	P02D5	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Fuel Injector Offset Learning At Min Limit	P02D6	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Fuel Injector Offset Learning At Max Limit	P02D7	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Fuel Injector Offset Learning At Min Limit	P02D8	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Fuel Injector Offset Learning At Max Limit	P02D9	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaining the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Fuel Injector Offset Learning At Min Limit	P02DA	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	 < **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Fuel Injector Offset Learning At Max Limit	P02DB	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaining the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger VGT A Initial Position Exceeded Learning Limit (VGT Smart)	P100B	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at EOL during the learning procedure is plausibile	physical travel measured at EOL < low threshold OR physical travel measured at EOL > high threshold	< 217.00 [counts] OR > 285.00 [counts]	Test enabled by calibration EOL Learning procedure at key off has been successfully completed End Of Trip event has elapsed No fault validated on smart VGT rolling counters	== 1.00 CFM_VGT_CommFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Shorted (ECB DC Motor)	P1413	This monitor checks if the HP EGR cooler bypass valve commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON	== 1.00 > 11.00 [V]	106.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Current Range/ Performance (ECB DC Motor)	P1414	This monitor checks if an excessive current flows through the HP EGR cooler bypass DC-Motor (e.g. shunt circuit between load, HP EGR cooler bypass DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration 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	== 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.
Exhaust Gas Recirculation Cooler Bypass Valve Supply Circuit (ECB DC Motor)	P1438	This monitor checks if the HP EGR cooler bypass DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve 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.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Exceeded Learning Limit (analog position sensor)	P24C4	This monitor checks if the HP EGR cooler bypass position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (cooling position and bypass position)	analog position raw voltage when the valve is in cooling position < low threshold OR analog position raw voltage when the valve is in cooling position > high threshold OR analog position raw voltage when the valve is in bypass position < low threshold OR analog position raw voltage when the valve is in bypass position > high threshold	< 16.00 [%5V] OR > 24.00 [%5V] OR < 60.90 [%5V] OR > 91.40 [%5V]	Test enabled by calibration Learning procedure at key off in fully closed and fully open position has been successfully completed: - engine coolant in range; - no faults present on engine coolant temperature. No faults present on HP EGR cooler bypass position sensor, HP EGR cooler bypass valve, HP EGR cooler bypass position deviation End Of Trip event has elapsed	= 1.00 >= 70.00 [°C] <= 129.00 [°C] ECT_Sensor_FA == FALSE CEB_ActrFlt == FALSE CEB_PstnSnsrFlt == FALSE CEB_ObstructionTFTKO == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Cooler Bypass Valve Motor Overtemperature (ECB DC Motor)	P2AA5	This monitor checks if the temperature of the HP EGR cooler bypass DC-Motor increases too much (e.g. HP EGR cooler bypass DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	== 1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2160	The diagnostic monitor detects no activity in the TCSS circuit due to an electrical fault, wiring fault or sensor fault. The TCSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TCSS signal registers below a threshold, the DTC will set.	transfer case output shaft speed sesnor raw speed	≤ 25.0 RPM	diagnotic monitor enable calibration transmission gear selector position AND engine torque AND engine torque NOT AND accelerator pedal position AND accelerator pedal position NOT transmission gear selector position AND engine torque AND engine torque NOT AND accelerator pedal position AND accelerator pedal position NOT run/crank voltage run/crank voltage engine power limited PTO active engine speed transmission output shaft speed update range change delay time when condition A or condition B or condition C (25 millisecond update rate):	= 1 Boolean = PARK OR NEUTRAL ≥ 8,191.75 Nm ≤ 8,191.75 Nm ≥ 100.00 % ≤ 8.00 % ≠ PARK AND ≠ NEUTRAL ≥ 80.00 Nm ≤ 35.00 ≥ 5.00 % ≤ 3.00 % ≥ 6.0 volts for 25 milliseconds ≥ 9.0 volts = FALSE Boolean = FALSE Boolean ≥ 300.0 RPM ≥ 181.0 RPM	fail time ≥ 4.50 seconds 25 millisecond update rate range change delay time ≥	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					condition A: transmission range state transmission range state previous loop (25 millisecond) condition B: test when transmission range state is reverse enable calibration AND transmission range state transmission range state previous loop (25 millisecond) condition C: test when transmission range state is neutral enable calibration AND transmission range state transmission range state previous loop (25 millisecond) P2161 test fail this key on P2160 test fail this key on P2160 fault active DTCs not fault active	 = drive8 or less = drive8 or less = 0 Boolean = REVERSE = REVERSE = 0 Boolean = NEUTRAL = NEUTRAL = FALSE Boolean = FALSE Boolean = FALSE Boolean Transmission Output Shaft Angular Velocity Validity CrankSensor_FA EngineTorqueEstInaccurate	**P2160 range change delay time** seconds Refer to "Transmission Supporting Tables" for details	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2161	The diagnostic monitor detects an unrealistic drop in the TCSS signal due to a sudden electrical fault, wiring fault or sensor fault. The TCSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TCSS signal drops above a delta threshold, a fail timer is enabled. When a TCSS drop occurs it is possible to enable the P2160 fail time as well as the PP2161 fail time. With both P2160 and P2161 fail timers active it is a race condition to either DTC.	transfer case speed sesnor raw speed delta, 25 millisecond update rate	≥ 650.0 RPM	diagnotic monitor enable calibration	= 1 Boolean	fail time ≥ 3.00 seconds, 25 millisecond update rate, increment fail count fail count ≥ 5 counts, 25 millisecond update rate	Type B, 2 Trips
					update range change delay time when condition A or condition B or condition C (25 millisecond update rate):		range change delay time ≥ **P2161 range change delay time** seconds Refer to "Transmission Supporting Tables" for details	
					condition A:			
					transmission range state	= drive8 or less		
					transmission range state previous loop (25 millisecond)	= drive8 or less		
					condition B:			
					test when transmission range state is reverse enable calibration	= 0 Boolean		
					AND			
					transmission range state	= REVERSE		
					transmission range state previous loop (25 millisecond)	= REVERSE		
					condition C:			
					test when transmission range state is neutral enable calibration	=0 Boolean		
					AND			
					transmission range state	= NEUTRAL		
					transmission range state previous loop (25 millisecond)	= NEUTRAL		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					run/crank voltage	≥ 6.0 volts for 25 milliseconds		
					run/crank voltage	≥ 9.0 volts		
					PTO active	= FALSE Boolean		
					transfer case mode	≠ transfer case mode previos loop (25 millisecond) update 4WD range change time		
						4WD range change time	≥ 5.00 seconds	
					engine speed	≥ 500.0 RPM		
					transmission output shaft speed loop to loop delta (25 millisecond)	≤ 4,095.0 RPM		
					AND			
					transmission output shaft speed	≥ 350.0 RPM		
					update stability time stability time	≥ 0.00 seconds		
					transfer case raw output speed	> 150.0 RPM		
					AND			
					transfer case raw output speed last loop (25 millisecond)	> 150.0 RPM		
					update stability time stability time	≥ 6.00 seconds		
					P2160 test fail this key on	= FALSE		
					P2160 fault active	= FALSE		
					DTCs not fault active	CrankSensor_FA TransmissionEngagedStat e_FA Transmission Output Shaft Angular Velocity Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor Stuck (continuous sensor)	P21C5	Continuous level sensor is able to measure small changes in height of DEF tank fluid so variation of level value is expected when fast accelerations or decelerations cause fluid sloshing. This monitor detects when a fault is causing measurements being constant during steep variations of vehicle speed.This diagnosis verifies that the DEF level sensor signal is stuck in range.	Difference between maximum and minimum DEF level values, sampled while vehicle is strongly accelerating	> 0.6 %	Sensor Bus Wake Up signal is active At least one message has been received by DEF device (Engine off timer AND Tank Temperature sampled at init AND UTLC Temperature sampled at init AND Tank Temperature greater AND UTLC Temperature) OR (Tank Temperature AND UTLC Temperature) Amount of valid level values since last test has run, sampled while vehicle is strongly accelerating, Absolute derivative of vehicle speed Estimated tank level volume No fault for: - serial communication with DEF device (SCRPM)	 > 14,400 s > -5.0 °C > -5.0 °C > -8.0 °C > -8.0 °C > 0.0 °C > 0.0 °C > 20 samples < 5.00 m/s^2 0.5 l < volume < 20.0 l U010E	8.00 failures out of 10.00 samples Time basis = 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- sensor bus wake up signal - level sensor out of range - DEF tank temperature sensor - UTLC temperature sensor - vehicle speed	 SCR_DEFLS_ElecFltSt SCR_DEFTS_FA		

Initial Supporting table - Down Stream Stk Temp Vrtn

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

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

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

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_EffRgnHysHi

Description:

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

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
35	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
45	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
55	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
65	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

Initial Supporting table - DPF_ResistFlowDsblHi

Description:

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

Initial Supporting table - DPF_ResistFlowDsblLo

Description:

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

Initial Supporting table - DPF_SootThrshCrtn

Description:

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

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	1,000	1,200	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	1,000	1,200	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqMaxThreshold

Description:

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

Initial Supporting table - EGT_FuelReqMinThrsh

Description:

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

Initial Supporting table - EGT1 DynChk EngPtEnbl

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

y/x	0.0	16.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT2 DynChk EngPtEnbl

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

y/x	0.0	10.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 DynChk EngPtEnbl

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

y/x	0.0	10.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
1,999.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT4 DynChk EngPtEnbl

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

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT5 DynChk EngPtEnbl

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

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

y/x	980	1,000	2,000	2,500	3,000	3,010	4,000	4,200
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	0	0	0
10	0	1	1	1	1	0	0	0
15	0	1	1	1	1	0	0	0
20	0	1	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
40	0	1	1	1	1	0	0	0
60	0	1	1	1	1	0	0	0
61	0	0	0	0	0	0	0	0

Initial Supporting table - EnginePointEnable_HC_TempDeviation

Description:

y/x	980	1,000	1,100	1,200	1,800	2,000	2,800	3,500
0	0	0	0	0	0	0	0	0
8	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - Inrush_current_profile

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

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

Initial Supporting table - Inrush_current_profile

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

Initial Supporting table - KaFADC_b_CB_EnblCMBR

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

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	1

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

KaFADC_b_CB_EnblCMBR - Part 4

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

Initial Supporting table - KaFADC_b_FSA_CombModeEnblRls

Description: Enable FSA correction release in a specific combustion mode

KaFADC_b_FSA_CombModeEnblRls - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 3

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

KaFADC_b_FSA_CombModeEnblRls - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaFADC_b_FSA_EnblCombMode

Description: Enable FSA learning in a specific combustion mode

KaFADC_b_FSA_EnblCombMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 3

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

KaFADC_b_FSA_EnblCombMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaFADC_b_SQC_CWA_EnblLink

Description: Engine speed ranges to be learned with CWA before give a positive report to Zero Torque Coordinator.

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

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh2

Description: Threshold 2 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm]

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh2 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	500	1,000	500	500	500	500	500	1,000	500	500	500

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	500	500	500	500	500	500	500	500	500	500	

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

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

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

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

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
1	200	200	200	200

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
1	200	200	200	200

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
1	200	200	200	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: Mpa

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

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	143	110	102	91	100

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-143	-110	-102	-91	-100

Initial Supporting table - KaOXYD_b_NOx1LoadChkCmbModeEnbl

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

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

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

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

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

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

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

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

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

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

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

Value Units: kPa

y/x	1,350	1,625	1,900	2,175	2,450
1	150	150	150	150	150

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

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

Value Units: mm^3

y/x	725	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000
1	0	40	50	60	70	80	90	90	90	80	45	0

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	10	20	30	40	50	60	70	80	90	100
400	11	12	14	17	20	23	24	26	27	29
600	12	13	15	17	20	23	24	26	27	29
800	13	14	16	18	21	24	24	26	27	29
1,000	13	15	17	19	22	24	25	27	28	30
1,200	13	15	17	20	23	25	26	28	29	31
1,400	13	15	17	20	23	26	27	29	30	31
1,600	13	15	17	20	23	26	28	30	31	32
1,800	13	15	17	20	23	26	28	30	31	33

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	10	20	30	40	50	60	70	80	90	100
400	-11	-12	-14	-17	-20	-23	-24	-26	-27	-29
600	-12	-13	-15	-17	-20	-23	-24	-26	-27	-29
800	-13	-14	-16	-18	-21	-24	-24	-26	-27	-29
1,000	-13	-15	-17	-19	-22	-24	-25	-27	-28	-30
1,200	-13	-15	-17	-20	-23	-25	-26	-28	-29	-31
1,400	-13	-15	-17	-20	-23	-26	-27	-29	-30	-31
1,600	-13	-15	-17	-20	-23	-26	-28	-30	-31	-32
1,800	-13	-15	-17	-20	-23	-26	-28	-30	-31	-33

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

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

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	0	65	65	100	100	100	100	100	100	100

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

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

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	160	160	160	160	160

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrsh

Description: Map used to define FSA emission correlated maximum threshold

Value Units: mm^3

y/x	4	11	13	14	18	19	24	25	28	29
350	6	6	6	6	8	8	8	8	8	8
375	6	6	6	6	8	8	8	8	8	8
400	6	6	6	6	8	8	8	8	8	8
450	6	6	6	6	8	8	8	8	8	8
500	6	6	6	6	8	8	8	8	8	8
550	8	8	8	8	8	8	8	8	8	8
600	8	8	8	8	8	8	8	8	8	8
800	8	8	8	8	8	8	8	8	8	8

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrsh

Description: Map used to define FSA emission correlated minimum threshold

Value Units: mm^3

y/x	4	11	13	14	18	19	24	25	28	29
350	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
375	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
400	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
450	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
500	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
550	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
600	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
800	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7

Initial Supporting table - KtGLOD_U_VoltLoDelMax(KnGLOD_I_GP_Curr)

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

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

Initial Supporting table - NOX_NOx2SelfTstEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor selt-test monitoring

NOX_NOx2SelfTstEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

NOX_S1_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	1	1

NOX_S1_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S1_OfstMntrEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S1_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OOR high monitor

NOX_S1_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 4

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

Initial Supporting table - NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OOR low monitor

NOX_S1_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S1_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_S1_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S1_OutRngMinCmbMode - Part 4

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

Initial Supporting table - NOX_S1_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S1_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor stability monitor

NOX_S1_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	1	1

NOX_S1_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S1_StBitChkEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	1	1

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S2_OfstMntrEnblCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OOR high monitor

NOX_S2_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 4

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

Initial Supporting table - NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OOR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

NOX_S2_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

NOX_S2_OutRngMinCmbMode - Part 4

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

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	1	1

NOX_S2_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

NOX_S2_StBitChkEnblCmbMode - Part 4

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

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

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

Value Units: kPa
X Unit: g/s

y/x	3	10	15	20	25	30	35	40
1	10	10	16	16	25	30	30	40

Initial Supporting table - P24A5: Gradient Temperature Threshold

Description: EGR Cooler Bypass Stuck diagnosis gradient temperature threshold map to be applied at EGR Cooler Bypass Stuck diagnosis. It is function of the EGR valve total flow.

Value Units: °C
X Unit: g/s

y/x	0	1	2	3	4	6	8	10
1	0	2	4	4	4	4	4	4

Initial Supporting table - P2598: Positive Position Tracking Error Threshold

Description: Position tracking error above which the VGT vanes positive position control deviation can detect the vanes stuck in a position more closed than its target position. It is function of ambient pressure.

Value Units: %
X Unit: kPa

y/x	60	70	80	90	100	110
1	15	15	15	15	15	15

Initial Supporting table - P2599: Negative Position Tracking Error Threshold

Description: Position tracking error below which the VGT vanes negative position control deviation can detect the vanes stuck in a position more open than its target position. It is function of ambient pressure.

Value Units: %
X Unit: kPa

y/x	60	70	80	90	100	110
1	-15	-15	-15	-15	-15	-15

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck diagnostic.

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

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

Initial Supporting table - 1st_FireAftrMisfr_Acel

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

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

y/x	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
2	0.29	0.30	0.27	0.49	0.47	0.27	0.21	0.32	0.36	0.33	0.30	0.29	0.38	0.39	0.35	0.34	0.36
6	0.46	0.54	0.50	0.49	0.57	0.44	0.27	0.32	0.43	0.36	0.30	0.29	0.38	0.39	0.35	0.34	0.36
8	0.36	0.48	0.45	0.50	0.71	0.55	0.44	0.47	0.48	0.33	0.33	0.29	0.38	0.39	0.35	0.34	0.36
12	0.29	0.39	0.43	0.49	0.89	0.71	0.63	0.65	0.77	0.61	0.54	0.70	0.50	0.59	0.60	0.40	0.40
18	0.23	0.33	0.39	0.49	0.89	0.78	0.76	0.71	0.82	1.00	0.81	1.08	0.64	0.68	0.69	0.68	0.86
24	0.22	0.31	0.38	0.49	0.90	0.81	0.70	0.75	0.73	1.05	0.85	0.99	0.69	0.70	0.78	0.66	0.89
30	0.21	0.30	0.37	0.49	0.91	0.82	0.68	0.91	0.70	1.12	0.86	1.01	0.69	0.62	0.74	0.61	0.79
60	0.19	0.28	0.36	0.49	0.93	0.90	0.67	0.76	0.61	1.04	0.82	0.91	0.71	0.46	0.60	0.51	0.38
98	0.27	0.28	0.36	0.49	0.93	0.93	0.66	0.75	0.58	1.05	0.82	0.87	0.71	0.37	0.57	0.47	0.29

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	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
2	-0.77	-0.70	-0.61	-0.78	-0.49	-0.52	-0.42	-0.36	-0.48	-0.59	-0.54	-0.43	-0.48	-0.52	-0.58	-0.59	-0.72
6	-0.77	-0.78	-0.78	-1.03	-0.83	-0.64	-0.68	-0.43	-0.50	-0.72	-0.54	-0.43	-0.48	-0.52	-0.58	-0.59	-0.72
8	-0.84	-0.78	-0.83	-1.14	-0.81	-0.79	-0.65	-0.68	-0.72	-0.74	-0.72	-0.48	-0.48	-0.52	-0.58	-0.59	-0.72
12	-0.80	-0.72	-0.75	-0.95	-0.72	-0.73	-0.72	-1.00	-1.33	-1.67	-0.74	-0.82	-0.76	-0.68	-0.61	-0.59	-0.72
18	-0.80	-0.74	-0.74	-0.81	-0.72	-0.68	-0.72	-0.90	-0.96	-1.50	-1.23	-1.00	-0.76	-0.73	-0.69	-0.70	-0.70
24	-0.81	-0.74	-0.73	-0.80	-0.73	-0.63	-0.72	-1.02	-0.99	-0.97	-1.14	-1.09	-0.84	-0.82	-0.72	-0.73	-0.73
30	-0.78	-0.75	-0.72	-0.76	-0.71	-0.64	-0.74	-1.12	-0.97	-0.98	-1.20	-1.13	-0.70	-0.80	-0.74	-0.76	-0.76
60	-0.96	-0.74	-0.70	-0.71	-0.70	-0.71	-1.31	-1.17	-0.73	-1.05	-1.34	-1.15	-0.64	-0.82	-0.72	-0.83	-0.81
98	-1.00	-0.93	-0.69	-0.69	-0.69	-0.74	-1.91	-1.17	-0.69	-1.06	-1.40	-1.15	-0.62	-0.86	-0.74	-0.86	-0.84

Initial Supporting table - 1stFireAfterMisJerkAFM

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

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

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

Initial Supporting table - 1stFireAftrMisAcelAFM

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

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

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

Initial Supporting table - Abnormal Cyl Mode

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

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

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

Initial Supporting table - Abnormal Rev Mode

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

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

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

Initial Supporting table - Abnormal SCD Mode

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

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

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

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

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

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	48	48	42	29	16	16

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

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

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	140	68	19	18	17	16

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

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

Value Units: °C
X Unit: °C

y/x	-21	-20	-10	0	10	20
1	140	68	55	42	29	16

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

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

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	45	45	39	26	13	13

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

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

Value Units: °C
X Unit: °C

y/x	-23	-22	-10	0	10	20
1	137	65	16	15	14	13

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

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

Value Units: °C
X Unit: °C

y/x	-21	-20	-10	0	10	20
1	137	65	52	39	26	13

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

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF High Oxygen, DPF parking neutral and SCR service warm up combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	75	75	75	75	75	75	75	75

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D2 and D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF Low Oxygen and DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	130	130	130	130	130	130	130	130

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for L3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DeSOx Lean combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	130	130	130	130	130	130	130	130

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for SCR

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

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	130	130	130	130	130	130	130	130

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

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF High Oxygen, DPF parking neutral and SCR service warm up combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	70	70	70	70	70	70	70	70

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D2 and D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF Low Oxygen and DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	125	125	125	125	125	125	125	125

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for L3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DeSOx Lean combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	125	125	125	125	125	125	125	125

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for others

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	125	125	125	125	125	125	125	125

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for SCR

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during SCR combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	125	125	125	125	125	125	125	125

Initial Supporting table - AIC_AirCntrlShtOffActn:Fuel High Threshold for others

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	130	130	130	130	130	130	130	130

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for C2 and C3

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 and C3 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	30	30	30	15	15	15	15	15	15	15	15	15	15

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

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF high O2, Rich idle and all HC modes and SCR service warm up. It is function of engine speed).

Value Units: mm^3
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	30	30	30	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D2 and D4

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF low O2. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	30	30	30	15	15	15	15	15	15	15	15	15	15

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

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

Value Units: mm^3
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	120	30	30	15	15	15	15	15	15	15	15	15	15

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

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

Value Units: mm^3
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	30	30	30	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 3 or DeNOx mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	120	30	30	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V2

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 2 or DeSOx Rich mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	750	900	1,000	1,100	1,250	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	120	30	30	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

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

Value Units: s
X Unit: rpm

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

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	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
10	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
50	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
80	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
100	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting table - Bank_SCD_Jerk

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - 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	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - 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	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Cat2_CrtdEffThrsh

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

y/x	250	266	282	298	314	330
1	20	20	20	20	20	20

Initial Supporting table - Cat2_CrtdMaxFuel

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

y/x	250	266	282	298	314	330
1	120	120	120	120	120	120

Initial Supporting table - Cat2CrtdEffRepEWMA

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

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

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

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

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

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

Initial Supporting table - CatCrtdEffRepEWMA

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

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

Initial Supporting table - CatCrtdEffThrsh

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

y/x	250	266	282	298	314	330
1	4	4	4	4	4	4

Initial Supporting table - CatCrtdMaxFuel

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

y/x	250	266	282	298	314	330
1	40	40	40	40	40	40

Initial Supporting table - ClyAfterAFM_Decel

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

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

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

Initial Supporting table - ClyBeforeAFM_Jerk

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

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

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

Initial Supporting table - CombustModeIdleTbl

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

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

CombustModeIdleTbl - Part 1

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

CombustModeIdleTbl - Part 2

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

CombustModeIdleTbl - Part 3

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

Initial Supporting table - ConsecCylModDecel

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

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

y/x	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
4	1.68	1.64	1.55	1.50	1.21	1.48	1.70	1.52	1.26	1.40	1.22	0.94	1.06	0.94	0.69	0.67	0.74
6	0.96	1.13	1.12	1.15	1.21	1.78	1.32	1.44	1.49	1.52	1.22	0.94	1.06	0.94	0.69	0.67	0.74
8	1.04	1.18	1.16	1.24	0.92	1.65	1.71	1.66	1.40	1.40	1.35	0.94	1.06	0.94	0.69	0.67	0.74
12	0.91	1.01	1.07	1.19	1.27	1.47	1.48	1.48	1.51	1.54	1.51	1.91	1.38	1.35	1.13	0.67	0.74
18	0.91	1.03	1.13	1.39	1.40	1.73	1.27	0.97	1.61	1.49	1.32	1.72	1.30	1.35	1.13	1.22	1.71
24	0.99	1.15	1.25	1.40	1.50	1.83	1.07	0.62	1.66	1.66	1.36	1.55	1.34	1.24	1.11	1.14	1.71
30	1.09	1.24	1.34	1.49	1.56	1.84	0.89	0.49	1.71	1.72	1.60	1.58	1.54	1.37	1.35	1.27	1.68
60	1.13	1.29	1.45	1.60	1.73	1.85	0.32	0.73	1.82	1.72	1.68	1.39	1.95	1.72	1.83	1.57	1.22
98	1.00	1.30	1.49	1.65	1.75	1.85	0.22	0.79	1.85	1.86	1.79	1.39	2.16	1.86	2.06	1.70	1.14

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	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
4	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
6	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0
60	0	0	0	0	0	0	-1	0	0	-1	-1	-2	0	0	0	0	0
98	0	0	0	0	0	0	-2	0	0	-1	-2	-2	0	0	0	0	0

Initial Supporting table - ConsecSCD_Decel

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecSCD_Jerk

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM_Jerk

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

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

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

Initial Supporting table - CylBeforeAFM_Decel

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

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

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

Initial Supporting table - CylModeDecel

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

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

CylModeDecel - Part 1

y/x	650	730	800	900	1,000	1,100	1,200	1,300	1,400	1,600	1,800	2,000	2,200
2	1,700	1,350	1,350	1,000	500	416	314	290	310	250	202	144	137
4	1,380	1,115	920	698	557	466	422	336	310	250	157	136	137
6	1,380	1,115	920	698	557	466	413	339	332	208	202	144	116
8	2,232	1,660	1,285	937	705	568	413	339	332	208	156	125	137
10	3,064	2,174	1,661	1,177	856	658	499	375	355	208	156	125	100
12	3,794	2,650	1,991	1,383	979	779	565	410	370	231	156	125	108
14	4,775	3,273	2,431	1,658	1,168	878	662	484	390	259	163	141	97
16	5,573	3,782	2,784	1,874	1,314	987	731	525	416	284	170	157	109
18	6,601	4,418	3,214	2,133	1,461	1,069	825	596	436	297	188	170	120
20	7,228	4,831	3,515	2,334	1,593	1,168	889	648	480	320	209	184	129
22	8,177	5,433	3,924	2,583	1,729	1,266	974	709	498	343	230	206	141
24	9,037	5,976	4,303	2,820	1,896	1,381	1,050	770	570	366	251	219	153
26	9,904	6,531	4,683	3,060	2,050	1,486	1,145	832	591	399	277	227	161
30	11,608	7,621	5,452	3,529	2,342	1,681	1,310	950	746	450	319	233	189
40	15,897	10,344	7,347	4,707	3,086	2,187	1,708	1,242	1,045	560	416	340	260
60	24,484	15,802	11,146	7,064	4,573	3,200	2,519	1,831	1,644	797	627	554	381
97	28,000	26,030	18,266	11,486	7,363	5,097	4,038	2,935	2,767	1,238	1,017	926	616

CylModeDecel - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800
2	100	95	98	71	68	66	55	51	50	44	40	40	40
4	100	95	98	71	68	66	55	51	50	44	40	40	40
6	92	95	98	71	68	66	55	51	50	44	40	40	40
8	100	86	98	71	68	66	55	51	50	44	40	40	40
10	90	77	79	55	68	66	55	51	50	44	40	40	40
12	90	77	49	55	52	46	30	31	50	44	40	40	40
14	90	77	49	55	52	46	30	31	28	19	18	18	18
16	83	77	49	55	52	46	30	31	28	19	18	18	18
18	93	77	49	55	52	46	30	31	28	19	18	18	18
20	93	87	56	55	52	46	30	31	28	19	18	18	18
22	97	95	64	57	55	46	30	31	28	19	18	18	18

Initial Supporting table - CylModeDecel

24	122	100	73	61	58	49	33	32	30	19	18	18	18
26	130	106	75	65	61	51	35	35	31	21	19	19	19
30	134	121	89	73	67	58	41	37	35	24	21	21	21
40	208	165	128	94	84	76	60	51	44	43	26	26	26
60	302	248	206	133	115	108	96	72	63	72	37	37	37
97	494	401	352	208	174	170	164	113	97	128	57	57	57

Initial Supporting table - CylModeJerk

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

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

CylModeJerk - Part 1

y/x	650	730	800	900	1,000	1,100	1,200	1,300	1,400	1,600	1,800	2,000	2,200
2	1,800	1,450	1,400	1,050	850	533	440	435	350	233	195	183	127
4	2,339	2,009	1,489	989	948	533	440	400	333	233	164	181	127
6	3,871	3,035	2,196	1,531	1,050	637	550	438	432	302	195	183	120
8	4,862	3,889	2,796	1,955	1,153	832	696	610	559	395	262	148	127
10	6,383	5,005	3,812	2,531	1,368	1,055	905	735	631	457	303	162	84
12	7,790	6,099	4,488	3,091	1,700	1,281	1,164	915	737	528	340	176	109
14	9,102	7,029	5,126	3,552	2,070	1,593	1,327	1,113	838	602	382	190	136
16	10,573	8,046	5,774	4,086	2,452	1,841	1,528	1,279	916	662	422	222	160
18	12,020	8,948	6,585	4,603	2,693	2,102	1,775	1,385	1,016	752	475	248	194
20	13,309	10,034	7,320	5,117	3,006	2,351	1,915	1,567	1,138	845	518	267	202
22	14,708	11,031	8,054	5,642	3,320	2,588	2,142	1,737	1,227	928	554	268	198
24	16,067	12,027	8,788	6,151	3,641	2,838	2,341	1,880	1,348	1,001	601	276	230
26	17,453	13,024	9,496	6,668	3,947	3,090	2,543	2,053	1,424	1,076	643	289	225
30	20,210	15,028	10,965	7,715	4,578	3,590	2,947	2,376	1,598	1,175	704	336	279
40	27,098	20,043	14,619	10,297	6,142	4,838	3,961	3,181	2,050	1,425	721	442	420
60	28,000	28,000	21,909	15,478	9,285	7,340	5,978	4,789	2,957	1,925	756	653	701
97	28,000	28,000	28,000	25,185	15,171	12,030	9,767	7,810	4,651	2,863	822	1,051	1,194

CylModeJerk - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800
2	96	89	94	68	67	68	56	48	50	43	38	38	38
4	96	89	94	68	67	68	56	48	50	43	38	38	38
6	79	89	94	68	67	68	56	48	50	43	38	38	38
8	96	75	94	68	67	68	56	48	50	43	38	38	38
10	55	89	74	51	67	68	56	48	50	43	38	38	38
12	61	101	79	60	55	60	45	43	50	43	38	38	38
14	67	101	84	69	67	68	50	48	42	38	32	32	32
16	67	101	90	78	78	73	56	53	50	43	35	35	35
18	93	94	97	89	89	80	65	57	55	47	37	37	37
20	122	90	100	95	98	86	71	63	58	50	39	39	39
22	134	129	106	100	103	89	77	68	62	52	42	42	42

Initial Supporting table - CylModeJerk

24	171	137	118	110	111	95	80	73	66	56	44	44	44
26	193	143	128	117	121	103	83	79	68	59	47	47	47
30	218	163	128	134	144	115	96	85	77	64	51	51	51
40	281	205	180	184	200	153	130	112	92	78	63	63	63
60	407	289	253	268	296	216	187	161	127	106	86	86	86
97	643	447	390	431	484	340	298	254	192	158	129	129	129

Initial Supporting table - DeacCylInversionDecel

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

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

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

Initial Supporting table - DeacCylInversionJerk

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

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

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

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_EffRgnHysHi

Description:

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

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
35	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
45	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
55	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
65	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

Initial Supporting table - DPF_ResistFlowDsblHi

Description:

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

Initial Supporting table - DPF_ResistFlowDsblLo

Description:

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

Initial Supporting table - DPF_SootThrshCrtn

Description:

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

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	1,000	1,200	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	1,000	1,200	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqMaxThreshold

Description:

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

Initial Supporting table - EGT_FuelReqMinThrsh

Description:

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

Initial Supporting table - EGT1 DynChk EngPtEnbl

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

y/x	0.0	16.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT2 DynChk EngPtEnbl

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

y/x	0.0	10.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 DynChk EngPtEnbl

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

y/x	0.0	10.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
1,999.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
3,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,000.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
4,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT4 DynChk EngPtEnbl

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

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT5 DynChk EngPtEnbl

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

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

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

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	4,800	4,800	4,800	4,800	4,800	4,800	4,800

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	4,800	3,900	4,800	3,900	4,800	4,800	

Initial Supporting table - EnginePointEnable_DPF_TempDeviation

Description:

y/x	980	1,000	2,000	2,500	3,000	3,010	4,000	4,200
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	0	0	0
10	0	1	1	1	1	0	0	0
15	0	1	1	1	1	0	0	0
20	0	1	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
40	0	1	1	1	1	0	0	0
60	0	1	1	1	1	0	0	0
61	0	0	0	0	0	0	0	0

Initial Supporting table - EnginePointEnable_HC_TempDeviation

Description:

y/x	980	1,000	1,100	1,200	1,800	2,000	2,800	3,500
0	0	0	0	0	0	0	0	0
8	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - Exhaust Gas Pressure Too Low Threshold

Description: Diagnostic threshold for the exhaust gas pressure too low monitoring. This threshold is function of the exhaust gas flow and of the soot trapped in the DPF

Value Units: kPa
X Unit: l/s
Y Units: % DPF load

y/x	10	20	60	100	140	200	200	200
65	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0
83	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
225	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0

Initial Supporting table - Flow Resistance High Threshold

Description: Diagnostic threshold for the flow resistance high monitoring. This threshold is function of the soot trapped in the DPF

Value Units: kPa/(l/s)
X Unit: % DPF load
Y Units: N/A

y/x	10	20	60	100	140	200	200	200
1	0	0	0	0	0	0	0	0

Initial Supporting table - IdleCyl_Decel

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

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

y/x	650	730	800	900	1,000	1,100	1,200	1,300	1,400	1,600	1,800	2,000	2,200
2	1,700	1,350	1,350	1,000	500	416	314	290	310	250	202	144	137
4	1,380	1,115	920	698	557	466	422	336	310	250	157	136	137
6	1,380	1,115	920	698	557	466	413	339	332	208	202	144	116
8	2,232	1,660	1,285	937	705	568	413	339	332	208	156	125	137
10	3,064	2,174	1,661	1,177	856	658	499	375	355	208	156	125	100
12	3,794	2,650	1,991	1,383	979	779	565	410	370	231	156	125	108
14	4,775	3,273	2,431	1,658	1,168	878	662	484	390	259	163	141	97
16	5,573	3,782	2,784	1,874	1,314	987	731	525	416	284	170	157	109
18	6,601	4,418	3,214	2,133	1,461	1,069	825	596	436	297	188	170	120
20	7,228	4,831	3,515	2,334	1,593	1,168	889	648	480	320	209	184	129
22	8,177	5,433	3,924	2,583	1,729	1,266	974	709	498	343	230	206	141
24	9,037	5,976	4,303	2,820	1,896	1,381	1,050	770	570	366	251	219	153
26	9,904	6,531	4,683	3,060	2,050	1,486	1,145	832	591	399	277	227	161
30	11,608	7,621	5,452	3,529	2,342	1,681	1,310	950	746	450	319	233	189
40	15,897	10,344	7,347	4,707	3,086	2,187	1,708	1,242	1,045	560	416	340	260
60	24,484	15,802	11,146	7,064	4,573	3,200	2,519	1,831	1,644	797	627	554	381
97	28,000	26,030	18,266	11,486	7,363	5,097	4,038	2,935	2,767	1,238	1,017	926	616

Initial Supporting table - IdleCyl_Jerk

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

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

y/x	650	730	800	900	1,000	1,100	1,200	1,300	1,400	1,600	1,800	2,000	2,200
2	1,800	1,450	1,400	1,050	850	533	440	435	350	233	195	183	127
4	2,339	2,009	1,489	989	948	533	440	400	333	233	164	181	127
6	3,871	3,035	2,196	1,531	1,050	637	550	438	432	302	195	183	120
8	4,862	3,889	2,796	1,955	1,153	832	696	610	559	395	262	148	127
10	6,383	5,005	3,812	2,531	1,368	1,055	905	735	631	457	303	162	84
12	7,790	6,099	4,488	3,091	1,700	1,281	1,164	915	737	528	340	176	109
14	9,102	7,029	5,126	3,552	2,070	1,593	1,327	1,113	838	602	382	190	136
16	10,573	8,046	5,774	4,086	2,452	1,841	1,528	1,279	916	662	422	222	160
18	12,020	8,948	6,585	4,603	2,693	2,102	1,775	1,385	1,016	752	475	248	194
20	13,309	10,034	7,320	5,117	3,006	2,351	1,915	1,567	1,138	845	518	267	202
22	14,708	11,031	8,054	5,642	3,320	2,588	2,142	1,737	1,227	928	554	268	198
24	16,067	12,027	8,788	6,151	3,641	2,838	2,341	1,880	1,348	1,001	601	276	230
26	17,453	13,024	9,496	6,668	3,947	3,090	2,543	2,053	1,424	1,076	643	289	225
30	20,210	15,028	10,965	7,715	4,578	3,590	2,947	2,376	1,598	1,175	704	336	279
40	27,098	20,043	14,619	10,297	6,142	4,838	3,961	3,181	2,050	1,425	721	442	420
60	28,000	28,000	21,909	15,478	9,285	7,340	5,978	4,789	2,957	1,925	756	653	701
97	28,000	28,000	28,000	25,185	15,171	12,030	9,767	7,810	4,651	2,863	822	1,051	1,194

Initial Supporting table - IdleSCD_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - IdleSCD_Jerk

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - InfrequentRegen

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

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

InfrequentRegen - Part 1

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

InfrequentRegen - Part 2

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

InfrequentRegen - Part 3

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

Initial Supporting table - K_EffExhFlowCond

Description: Enablement table, function of exhaust flow and SCR average temperature [boolean] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: boolean
X Unit: °C
Y Units: g/sec

y/x	200	225	250	255	285	300	325	350	375	400	425	450	475	500	550
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
25	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
30	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
35	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
40	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
50	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
60	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
70	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
80	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
100	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADC_b_CB_EnblCMBR

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

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	1

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	1	0	0	0	0	1

KaFADC_b_CB_EnblCMBR - Part 4

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

Initial Supporting table - KaFADC_b_FSA_CombModeEnblRls

Description: Enable FSA correction release in a specific combustion mode

KaFADC_b_FSA_CombModeEnblRls - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 3

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

KaFADC_b_FSA_CombModeEnblRls - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_CombModeEnblRls - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaFADC_b_FSA_EnblCombMode

Description: Enable FSA learning in a specific combustion mode

KaFADC_b_FSA_EnblCombMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 3

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

KaFADC_b_FSA_EnblCombMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADC_b_FSA_EnblCombMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KaFADC_b_SQC_CWA_EnblLink

Description: Engine speed ranges to be learned with CWA before give a positive report to Zero Torque Coordinator.

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

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh2

Description: Threshold 2 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm]

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh2 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	500	1,000	500	500	500	500	500	1,000	500	500	500

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	500	500	500	500	500	500	500	500	500	500	

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

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

Value Units: rpm

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

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

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

Value Units: rpm

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

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
1	200	200	200	200

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
1	200	200	200	200

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
1	200	200	200	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: MPa

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

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	143	110	102	91	100

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-143	-110	-102	-91	-100

Initial Supporting table - KaFADD_b_FSA_ECM_EnblCmbMode

Description: Enable P026C and P026D in a specific combustion mode

KaFADD_b_FSA_ECM_EnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

KaFADD_b_FSA_ECM_EnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2
1	0	0	0	0	0

KaFADD_b_FSA_ECM_EnblCmbMode - Part 3

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

KaFADD_b_FSA_ECM_EnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp
1	0	0	0	0	0

KaFADD_b_FSA_ECM_EnblCmbMode - Part 5

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_SCR_DeSOx			
1	0	0			

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

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

Value Units: MPa

y/x	1,350	1,625	1,900	2,175	2,450
1	150	150	150	150	150

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

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

Value Units: mm^3

y/x	725	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000
1	0	40	50	60	70	80	90	90	90	80	45	0

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	10	20	30	40	50	60	70	80	90	100
400	11	12	14	17	20	23	24	26	27	29
600	12	13	15	17	20	23	24	26	27	29
800	13	14	16	18	21	24	24	26	27	29
1,000	13	15	17	19	22	24	25	27	28	30
1,200	13	15	17	20	23	25	26	28	29	31
1,400	13	15	17	20	23	26	27	29	30	31
1,600	13	15	17	20	23	26	28	30	31	32
1,800	13	15	17	20	23	26	28	30	31	33

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	10	20	30	40	50	60	70	80	90	100
400	-11	-12	-14	-17	-20	-23	-24	-26	-27	-29
600	-12	-13	-15	-17	-20	-23	-24	-26	-27	-29
800	-13	-14	-16	-18	-21	-24	-24	-26	-27	-29
1,000	-13	-15	-17	-19	-22	-24	-25	-27	-28	-30
1,200	-13	-15	-17	-20	-23	-25	-26	-28	-29	-31
1,400	-13	-15	-17	-20	-23	-26	-27	-29	-30	-31
1,600	-13	-15	-17	-20	-23	-26	-28	-30	-31	-32
1,800	-13	-15	-17	-20	-23	-26	-28	-30	-31	-33

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

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

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	0	65	65	100	100	100	100	100	100	100

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

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

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	160	160	160	160	160

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrsh

Description: Map used to define FSA emission correlated maximum threshold

Value Units: mm^3

y/x	4	11	13	14	18	19	24	25	28	29
350	6	6	6	6	8	8	8	8	8	8
375	6	6	6	6	8	8	8	8	8	8
400	6	6	6	6	8	8	8	8	8	8
450	6	6	6	6	8	8	8	8	8	8
500	6	6	6	6	8	8	8	8	8	8
550	8	8	8	8	8	8	8	8	8	8
600	8	8	8	8	8	8	8	8	8	8
800	8	8	8	8	8	8	8	8	8	8

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrsh

Description: Map used to define FSA emission correlated minimum threshold

Value Units: mm^3

y/x	4	11	13	14	18	19	24	25	28	29
350	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
375	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
400	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
450	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
500	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
550	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
600	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7
800	-6	-6	-6	-6	-6	-6	-6	-6	-7	-7

Initial Supporting table - m_NH3_StrgDevErrMaxThrsh

Description: Higher boundary of NH3 Storage Deviation Error [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMinThrsh

Description: Lower boundary of NH3 Storage Deviation Error [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgMaxThrsh

Description: Higher boundary of estimated NH3 Storage [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	3	3	3	3	3	3	3	3

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 Storage [g] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	1	1	1	1	1	1	0	0

Initial Supporting table - m_SlipNOxIntglThrsh

Description: NOx integral threshold to enable Slip Condition based on SCR average Temperature [mg] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: mg
X Unit: °C

y/x	250	300	350	425
1	500	500	500	500

Initial Supporting table - Maximum allowed time to complete regeneration

Description:

Value Units: enumerative (mission profiles)
X Unit: seconds
Y Units: N/A

Maximum allowed time to complete regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	7,200	7,200	7,200	7,200	7,200	7,200	7,200

Maximum allowed time to complete regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	7,200	7,200	7,200	7,200	7,200	7,200	7,200

Maximum allowed time to complete regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	7,200	7,200	7,200	7,200	7,200		

Initial Supporting table - Maximum allowed time to reach steady state for regeneration

Description:

Value Units: seconds
X Unit: enumerative (mission profiles)
Y Units: N/A

Maximum allowed time to reach steady state for regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	2,700	2,700	2,700	2,700	2,700	2,700	2,700

Maximum allowed time to reach steady state for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	2,700	2,700	2,700	2,700	2,700	2,700	2,700

Maximum allowed time to reach steady state for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	2,700	2,700	2,700	2,700	2,700		

Initial Supporting table - Maximum allowed time to release post injections for regeneration

Description:

Value Units: enumerative (mission profiles)
X Unit: seconds
Y Units: N/A

Maximum allowed time to release post injections for regeneration - Part 1

y/x	CeDPFR_e_MisProf0	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	5,000	5,000	5,000	5,000	5,000	5,000	5,000

Maximum allowed time to release post injections for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	5,000	5,000	5,000	5,000	5,000	5,000	5,000

Maximum allowed time to release post injections for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	5,000	5,000	5,000	5,000	5,000		

Initial Supporting table - Number of Normals

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

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

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

Initial Supporting table - P0087 Minimum rail pressure

Description: Minimum rail pressure threshold (MPa) as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	510	511	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	0	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13

Initial Supporting table - P0089 Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Metering Unit as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,500	4,250	5,250
1	67	217	217	117

Initial Supporting table - P0101: Pulsation Map

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

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

y/x	600	800	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,200	3,400	3,600	3,800	4,200
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	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
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0181 Fuel Temperature Plausibility

Description: Minimum temperature deviation (°C) as function of engine off time (s) in order to consider not plausible fuel temperature sensor.

Value Units: °C
X Unit: s

y/x	5	7	9	11	13	15	17	19
1	20	20	20	20	20	20	20	20

Initial Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Define which sensor is used as reference for check plausibility of fuel temperature sensor. (CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_IAT_Snsr = Intake air temperature, CeFTSR_e_IAT_2_Snsr = Manifold air temperature, CeFTSR_e_MainCatTempSnsr = Upstream DPF temperature)

Value Units: -

y/x	1
1	CeFTSR_e_MainCatTempSnsr

Initial Supporting table - P0191 Rail Pressure Sensor Configuration

Description:

Value Units: -

y/x	1
1	CeFHPG_e_RPS_DoubleTrack

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

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

Value Units: boolean

P0234, P0299: Boost pressure control deviation enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

P0234, P0299: Boost pressure control deviation enabling - Part 4

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

Initial Supporting table - P0234, P2263: Overboost barometric correction

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

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

y/x	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

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

Value Units: kPa
X Unit: kPa

y/x	75	83	97	110
1	200	200	200	200

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

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

Value Units: kPa
X Unit: kPa

y/x	75	83	97	110
1	146	146	120	120

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

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

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

y/x	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
750	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
1,000	-28	-28	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23
1,250	-28	-28	-23	-23	-23	-23	-23	-18	-18	-18	-18	-18	-18	-18	-18
1,500	-28	-28	-28	-15	-15	-15	-16	-18	-18	-18	-18	-18	-18	-18	-18
1,750	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
2,000	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
2,250	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
2,500	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
3,000	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40
4,200	-30	-30	-20	-20	-20	-20	-20	-20	-20	-20	-20	-30	-40	-50	-50

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

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

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

y/x	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
750	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
1,000	-28	-28	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23
1,250	-28	-28	-23	-23	-23	-23	-23	-18	-18	-18	-18	-18	-18	-18	-18
1,500	-28	-28	-28	-15	-15	-15	-16	-18	-18	-18	-18	-18	-18	-18	-18
1,750	-28	-28	-28	-10	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
2,000	-28	-28	-28	-10	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
2,250	-28	-28	-28	-11	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
2,500	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
3,000	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16
4,200	-28	-28	-28	-13	-13	-13	-15	-16	-16	-16	-16	-16	-16	-16	-16

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	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	4,200
1	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0299, P2263: Underboost barometric correction

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

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

y/x	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

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

Value Units: kPa
X Unit: kPa

y/x	75	83	97	110
1	250	250	250	250

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

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

Value Units: kPa
X Unit: kPa

y/x	75	83	97	110
1	170	170	154	154

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

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

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

y/x	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
750	47	47	47	47	47	47	47	47	47	47	47	47	47	37	37
1,000	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1,250	42	42	37	37	37	37	37	37	37	32	32	32	32	32	32
1,500	42	42	37	37	37	37	37	37	37	32	32	32	32	32	32
1,750	42	42	37	37	37	37	37	37	37	30	30	30	30	30	30
2,000	42	42	37	37	32	32	30	30	30	30	30	30	30	30	30
2,250	42	42	37	37	32	32	30	30	30	30	30	30	30	30	30
2,500	42	42	37	37	32	32	30	30	30	30	30	30	30	30	30
3,000	37	37	37	37	37	37	37	37	37	37	37	37	37	47	57
4,200	47	47	37	37	37	37	37	37	37	37	37	47	57	67	67

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

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

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

y/x	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295
750	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1,000	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1,250	42	42	37	37	37	37	37	37	37	32	32	32	32	32	32
1,500	42	42	37	37	37	37	37	37	37	32	32	32	32	32	32
1,750	42	42	37	37	29	29	30	37	37	30	30	30	30	30	30
2,000	42	42	37	37	29	29	30	30	30	30	30	30	30	30	30
2,250	42	42	37	37	32	32	30	30	30	30	30	30	30	30	30
2,500	42	42	37	37	32	32	30	30	30	30	30	30	30	30	30
3,000	42	42	37	37	32	32	32	32	32	32	32	32	32	32	32
4,200	42	42	37	37	35	35	35	35	35	35	35	35	35	35	35

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	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	4,200
1	2	2	1	1	1	1	2	2	2	2

Initial Supporting table - P0401, P0402: EGR flow monitor enabling

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

Value Units: boolean

P0401, P0402: EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

P0401, P0402: EGR flow monitor enabling - Part 4

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

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-7	-5	0	5	10	15	20	25	30	35
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-7	-5	0	5	10	15	20	25	30	35
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-7	-5	0	5	10	15	20	25	30	35
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	730	1,250	1,800	2,100	2,400	2,500	3,000	4,200
0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	730	1,250	1,800	2,100	2,400	2,500	3,000	4,200
0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	730	1,250	1,800	2,100	2,400	2,500	3,000	4,200
0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	730	1,250	1,800	2,100	2,400	2,500	3,000	4,200
0	-120	-120	-72	-72	-72	-80	-504	-504
20	-160	-152	-72	-72	-72	-80	-504	-504
25	-208	-152	-72	-72	-72	-80	-504	-504
30	-248	-152	-72	-72	-72	-80	-504	-504
35	-264	-224	-72	-72	-72	-80	-504	-504
40	-296	-192	-72	-72	-72	-80	-504	-504
45	-368	-208	-72	-72	-72	-80	-504	-504
50	-432	-368	-368	-368	-504	-504	-504	-504
60	-504	-504	-504	-504	-504	-504	-504	-504

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	730	1,250	1,800	2,100	2,400	2,500	3,000	4,200
0	-120	-120	-88	-88	-88	-160	-504	-504
20	-160	-152	-88	-88	-88	-160	-504	-504
25	-208	-152	-88	-88	-88	-160	-504	-504
30	-248	-152	-88	-88	-88	-160	-504	-504
35	-264	-224	-88	-88	-88	-160	-504	-504
40	-296	-192	-88	-88	-88	-160	-504	-504
45	-368	-208	-88	-88	-88	-160	-504	-504
50	-432	-368	-368	-368	-504	-504	-504	-504
60	-504	-504	-504	-504	-504	-504	-504	-504

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

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

y/x	730	1,250	1,800	2,100	2,400	2,500	3,000	4,200
0	-120	-120	-112	-112	-112	-112	-504	-504
20	-160	-120	-112	-112	-112	-112	-504	-504
25	-208	-152	-112	-112	-112	-112	-504	-504
30	-248	-200	-112	-112	-112	-112	-504	-504
35	-264	-224	-112	-112	-112	-112	-504	-504
40	-296	-192	-112	-112	-112	-112	-504	-504
45	-368	-208	-112	-112	-112	-112	-504	-504
50	-432	-368	-112	-112	-112	-112	-504	-504
60	-504	-504	-504	-504	-504	-504	-504	-504

Initial Supporting table - P0401: Minimum desired EGR flow

Description: Minimum desired EGR flow above which the insufficient EGR flow is enabled. It is function of barometric pressure.

Value Units: mg
X Unit: kPa

y/x	70	75	87	100
1	136	136	140	144

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	1	0	0	0
CePISR_e_EventA_Seq	1	0	0	0
CePISR_e_EventB_Seq	1	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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

Description: Fail threshold for PSW per operating loop.

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

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	5	

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

Description: Sample threshold for PSW per operating loop.

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

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P140B, P140C: EGR slow response enabling

Description: Calibration map for the enabling of EGR slow response monitoring, function of combustion mode.

Value Units: boolean

P140B, P140C: EGR slow response enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	1	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

P140B, P140C: EGR slow response enabling - Part 4

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

Initial Supporting table - P140B: Increasing EGR slow response threshold

Description: Threshold for increasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	75	84	97
1	5	6	7

Initial Supporting table - P140C: Decreasing EGR slow response threshold

Description: Threshold for decreasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	75	84	97
1	3	4	5

Initial Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - P16F3_CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	2,506	1,394	1,018	840	703	614	553	508	468	436	410	390	371	354	340	326	319

Initial Supporting table - P16F3_EIA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	2,506	1,394	1,018	840	703	614	553	508	468	436	410	390	371	354	340	326	319

Initial Supporting table - P16F3_FTD safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on FTD Energizing Time compensation as function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	2,506	1,394	1,018	840	703	614	553	508	468	436	410	390	371	354	340	326	319

Initial Supporting table - P16F3_Rail Pressure Wave Compensation f(Fuel Rail Pressure, Fuel Quantity)

Description: Safety treshold for the Rail Pressure Wave Compensation on each torque forming pulse as a function of Fuel Rail Pressure and Fuel Quantity

y/x	0	0	0	0	0	0	0	0	0	0	0	0
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P16F3_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
500	239	212	196	158	120	120
700	233	206	190	110	67	67
800	212	185	169	89	46	46
850	205	178	161	82	41	41
900	197	170	154	74	36	36
1,000	182	156	141	83	45	45
1,100	164	139	124	88	53	53
1,200	145	121	107	93	60	60
1,300	147	125	113	101	72	72
1,400	149	129	119	109	84	84
1,500	93	73	63	53	28	28
1,750	11	-9	-19	-29	-54	-54
2,000	-220	-220	-220	-220	-220	-220
2,500	-242	-242	-242	-242	-242	-242
3,000	-264	-264	-264	-264	-264	-264
3,500	-286	-286	-286	-286	-286	-286
4,500	-286	-286	-286	-286	-286	-286

Initial Supporting table - P16F3_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	18	35	51	68	84	101	117	134	150	167	183	200
1	2,182	1,207	862	706	605	537	484	448	415	392	373	360

Initial Supporting table - P16F3_TSC safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on Energizing Time compensation for Temperature Specific Current (TSC) (for each torque forming pulse) as function of Fuel Rail Pressure

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	2,506	1,394	1,018	840	703	614	553	508	468	436	410	390	371	354	340	326	319

Initial Supporting table - P16F3_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	1,253	697	509	420	352	307	277	254	234	218	205	195	186	177	170	163	160

Initial Supporting table - P16F3_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	-1,253	-697	-509	-420	-352	-307	-277	-254	-234	-218	-205	-195	-186	-177	-170	-163	-160

Initial Supporting table - P2263: Boost pressure system performance monitor delay timer

Description: Delay timer before enabling the boost pressure system performance monitor once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

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

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control active)

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

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

y/x	100	150	175	200	225	250	275	300
1,500	-30	-30	-30	-25	-25	-25	-25	-25
2,000	-30	-30	-30	-25	-25	-25	-25	-25
2,500	-30	-30	-30	-25	-25	-25	-25	-25
3,000	-30	-30	-30	-25	-25	-25	-25	-25
3,500	-30	-30	-30	-25	-25	-25	-25	-25
4,000	-30	-30	-30	-25	-25	-25	-25	-25
4,500	-30	-30	-30	-25	-25	-25	-25	-25

Initial Supporting table - P2263: Boost pressure system performance negative error threshold (throttle control not active)

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

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

y/x	100	150	175	200	225	250	275	300
1,500	-40	-40	-40	-35	-35	-35	-35	-35
2,000	-40	-40	-40	-35	-35	-35	-35	-35
2,500	-40	-40	-40	-35	-35	-35	-35	-35
3,000	-40	-40	-40	-35	-35	-35	-35	-35
3,500	-40	-40	-40	-35	-35	-35	-35	-35
4,000	-40	-40	-40	-35	-35	-35	-35	-35
4,500	-40	-40	-40	-35	-35	-35	-35	-35

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control active)

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

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

y/x	100	150	175	200	225	250	275	300
1,500	30	30	30	25	25	25	25	25
2,000	30	30	30	25	25	25	25	25
2,500	30	30	30	25	25	25	25	25
3,000	30	30	30	25	25	25	25	25
3,500	30	30	30	25	25	25	25	25
4,000	30	30	30	25	25	25	25	25
4,500	30	30	30	25	25	25	25	25

Initial Supporting table - P2263: Boost pressure system performance positive error threshold (throttle control not active)

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

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

y/x	100	150	175	200	225	250	275	300
1,500	40	40	40	50	50	50	50	50
2,000	40	40	40	50	50	50	50	50
2,500	40	40	40	50	50	50	50	50
3,000	40	40	40	50	50	50	50	50
3,500	40	40	40	50	50	50	50	50
4,000	40	40	40	50	50	50	50	50
4,500	40	40	40	50	50	50	50	50

Initial Supporting table - P228A Fuel High Pressure Pump efficiency

Description: Efficiency percentage of high pressure pump as function of rail pressure (MPa) and engine speed (rpm).

Value Units: %
X Unit: MPa
Y Units: rpm

y/x	30	80	100	120	200
0	0	100	100	100	100
1,000	54	89	86	84	100
1,800	96	90	88	85	100
2,300	96	90	88	86	100
2,800	96	90	88	86	100
3,250	96	90	88	86	100
3,750	93	87	85	83	100
4,400	85	82	78	77	100

Initial Supporting table - P228A Fuel High Pressure Pump efficiency correction

Description: Correction of high pressure pump eficiency as function of fuel temperature (°C).

Value Units: -
X Unit: °C

y/x	-40	-20	20	40	80
1	1	1	1	1	1

Initial Supporting table - P228B Pressure Regulator completely closed command

Description: Command, in terms of pressure (MPa), to consider pressure regulator valve completely closed as function of rail pressure (MPa).

Value Units: MPa
X Unit: MPa

y/x	0	100	190	250
1	30	30	30	30

Initial Supporting table - P228C P228D Air ambient pressure calibrated as enabling condition (MU)

Description: 0 = air ambient pressure is not considered as enabling condition, 1 = air ambient pressure is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P228C P228D Air ambient temperature calibrated as enabling condition (MU)

Description: 0 = air ambient temperature is not considered as enabling condition, 1 = air ambient temperature is considered as enabling condition

y/x	1
1	1

Initial Supporting table - P228C P228D Low fuel level calibrated as enabling condition (MU)

Description: 0 = low fuel level is not considered as enabling condition, 1 = low fuel level is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P228C Positive rail pressure deviation (MU)

Description: Positive rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	510	511	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	80	80	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - P228D Negative rail pressure deviation (MU)

Description: Negative rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	510	511	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	-80	-80	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P2293 Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Pressure Regulator as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,500	4,250	5,250
1	67	217	217	117

Initial Supporting table - P229A P229B Air ambient pressure calibrated as enabling condition (PR)

Description: 0 = air ambient pressure is not considered as enabling condition, 1 = air ambient pressure is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A P229B Air ambient temperature calibrated as enabling condition (PR)

Description: 0 = air ambient temperature is not considered as enabling condition, 1 = air ambient temperature is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A P229B Low fuel level calibrated as enabling condition (PR)

Description: 0 = low fuel level is not considered as enabling condition, 1 = low fuel level is considered as enabling condition

Value Units: -

y/x	1
1	1

Initial Supporting table - P229A Positive rail pressure deviation (PR)

Description: Positive rail pressure deviation threshold (MPa) when pressure regulator is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	510	511	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	80	80	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - Pair_SCD_Decel

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

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

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

y/x	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
4	1.96	1.52	1.32	1.03	1.04	0.62	0.88	0.67	0.54	0.53	0.51	0.44	0.53	0.45	0.42	0.48	0.42
6	1.76	1.40	1.10	0.90	0.95	0.74	0.68	0.63	0.64	0.58	0.51	0.44	0.53	0.45	0.42	0.48	0.42
8	1.17	1.05	0.99	0.85	0.98	0.64	0.89	0.73	0.60	0.53	0.56	0.44	0.53	0.45	0.42	0.48	0.42
12	0.84	0.82	0.86	0.70	0.85	0.76	0.87	0.70	0.67	0.58	0.63	0.90	0.69	0.64	0.69	0.48	0.42
18	0.81	0.79	0.78	0.71	0.68	0.73	0.84	0.55	0.66	0.67	0.53	0.73	0.63	0.64	0.69	0.87	0.97
24	0.80	0.78	0.78	0.73	0.71	0.76	0.79	0.66	0.73	0.64	0.61	0.64	0.72	0.64	0.71	0.76	0.98
30	0.76	0.75	0.76	0.75	0.72	0.74	0.75	0.79	0.72	0.68	0.68	0.72	0.75	0.73	0.81	0.83	1.02
60	0.72	0.71	0.73	0.76	0.69	0.75	0.69	0.71	0.72	0.63	0.70	0.69	0.88	0.83	0.92	0.76	0.57
98	1.00	0.70	0.72	0.77	0.69	0.76	0.67	0.71	0.74	0.70	0.74	0.69	0.94	0.89	1.00	0.72	0.53

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	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
4	2.39	1.91	1.94	1.89	1.38	1.46	1.84	1.22	1.40	1.44	1.18	1.10	1.37	1.06	1.03	0.99	0.99
6	1.09	1.02	0.97	1.41	1.10	1.13	1.54	1.21	1.48	1.74	1.18	1.10	1.37	1.06	1.03	0.99	0.99
8	1.13	1.00	0.97	1.19	0.90	0.72	1.15	1.49	1.70	1.69	1.40	1.10	1.37	1.06	1.03	0.99	0.99
12	1.11	0.89	0.93	0.99	0.72	0.65	0.85	1.11	1.50	2.05	1.00	1.13	1.48	1.20	1.14	0.99	0.99
18	1.09	0.91	0.88	0.87	0.69	0.60	0.76	1.02	0.97	1.50	1.09	0.88	0.83	0.86	0.80	0.87	0.89
24	1.03	0.87	0.83	0.84	0.66	0.64	0.77	1.25	1.13	1.08	1.09	0.99	0.85	0.79	0.71	0.78	0.78
30	1.04	0.87	0.80	0.81	0.67	0.69	0.79	1.27	1.08	1.05	1.16	1.12	0.77	0.83	0.82	0.86	0.83
60	0.98	0.85	0.74	0.77	0.65	0.82	1.37	1.32	0.89	1.22	1.32	1.22	0.75	0.89	0.96	0.82	0.91
98	0.98	0.98	0.72	0.75	0.64	0.89	1.98	1.33	0.84	1.27	1.39	1.31	0.73	0.95	1.05	0.80	0.94

Initial Supporting table - Rail Pressure Control Configuration

Description: CeFHPG_e_MU_And_PR_ModeSel = pressure control can be governed by both metering unit and pressure regulator
CeFHPG_e_MU = pressure control can be governed by metering unit only
CeFHPG_e_PR = pressure control can be governed by pressure regulator only

Value Units: -

y/x	1
1	CeFHPG_e_MU_And_PR_ModeSel

Initial Supporting table - Random_SCD_Decel

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Jerk

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

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

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

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

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

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

Initial Supporting table - RandomAFM_Jerk

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

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

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

Initial Supporting table - RandomCylModDecel

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

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

y/x	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.61	1.82	1.71	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	2.47	2.42	2.33	2.02	1.93	1.67	1.16	1.12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	2.47	2.30	2.62	2.20	2.44	2.28	2.15	1.30	1.54	1.27	1.39	1.65	1.09	1.28	1.58	1.00	1.00
18	2.22	2.14	2.71	2.42	2.44	2.56	2.49	1.47	1.59	1.67	1.57	2.08	1.41	1.74	1.78	1.89	2.30
24	2.21	2.14	2.82	2.59	2.58	2.79	2.37	1.60	1.73	1.70	1.67	1.87	1.79	1.88	2.19	2.10	2.65
30	2.18	2.11	2.87	2.66	2.50	2.77	2.33	1.93	1.71	1.77	1.75	1.71	2.05	1.96	2.19	2.10	2.20
60	1.14	2.05	2.95	2.81	2.35	2.80	2.25	1.75	1.75	1.57	1.68	1.28	2.25	1.78	2.03	2.00	1.15
98	1.00	1.53	2.44	2.88	2.35	2.80	2.21	1.73	1.78	1.71	1.70	1.21	2.38	1.78	2.03	2.06	1.20

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	650	800	900	1,100	1,300	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200	3,400	3,800	4,000	4,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.07	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.09	1.00	1.11	1.19	1.01	1.00	1.00	1.07	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.18	1.00	1.23	1.23	1.01	1.05	1.00	1.06	1.33	2.15	1.01	1.19	1.01	1.00	1.03	1.00	1.00
18	1.25	1.04	1.28	1.20	1.01	1.00	1.00	1.13	1.10	1.83	1.35	1.15	1.00	1.00	1.00	1.00	1.00
24	1.28	1.04	1.29	1.22	1.02	1.02	1.00	1.42	1.28	1.28	1.29	1.25	1.00	1.00	1.00	1.00	1.00
30	1.23	1.04	1.30	1.22	1.02	1.07	1.07	1.50	1.24	1.34	1.40	1.31	1.00	1.00	1.00	1.00	1.00
60	1.00	1.05	1.32	1.21	1.03	1.27	1.87	1.65	1.04	1.44	1.61	1.30	1.00	1.00	1.00	1.02	1.00
98	1.00	1.00	1.11	1.21	1.03	1.38	2.74	1.69	1.00	1.47	1.69	1.35	1.00	1.00	1.00	1.03	1.00

Initial Supporting table - RandomRevModDecl

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

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

y/x	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

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

Value Units: multiplier
X Unit: RPM

y/x	800	1,100	1,400	1,800	2,000	2,200	2,400	3,200	4,400
1	1.00	1.00	1.00	1.00	1.20	1.15	1.50	1.15	1.00

Initial Supporting table - RevMode_Decel

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

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

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

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	5	5	5	5	5	5	5	5	5

Initial Supporting table - SCD_Decel

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SCD_Jerk

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SnapDecayAfterMisfire

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

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

y/x	800	1,100	1,400	1,800	2,000	2,200	2,400	3,200	4,400
1	1.00	1.00	1.00	2.44	1.96	1.48	1.00	1.00	1.00
1	1.00	1.00	1.00	1.00	1.65	1.26	1.50	1.15	1.00
1	1.00	1.00	1.00	1.00	1.17	1.00	1.33	1.05	1.00
1	1.00	1.00	1.00	1.20	1.00	1.00	1.23	1.05	1.00
2	1.00	1.00	1.02	1.26	1.16	1.10	1.13	1.00	1.00
2	1.47	1.55	1.00	1.19	1.65	1.20	2.46	1.00	1.00
3	1.68	1.15	1.00	1.06	1.96	2.26	3.17	1.00	1.00
5	1.75	1.13	1.24	1.24	1.23	1.75	1.96	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - t_DerTempDsblTmr

Description: Disabling timer based on the time derivative of SCR average temperature [sec] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: sec
X Unit: °C/sec

y/x	-10	-5	0	2	5	9	10	12
1	10	10	10	10	10	10	90	180

Initial Supporting table - T_MaxTempGrad

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

Value Units: °C
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	35	35	35	35	35	35	35	35

Initial Supporting table - T_MinTempGrad

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

Value Units: °C
X Unit: °C

y/x	100	150	200	250	300	350	400	450
1	-35	-35	-35	-35	-35	-35	-35	-35

Initial Supporting table - t_NOxFlowIncDsblTmr

Description: Debounce time to wait after the NOx flow enter in range [sec] for SCR NOx Catalyst Efficiency monitoring (P20EE)

Value Units: sec
X Unit: mg/sec
Y Units: sec

y/x	5	15	30	45	60	90	120
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0

Initial Supporting table - TOSSRoughRoadThres

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

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
500	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
700	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
800	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
900	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,000	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - WaitToStart

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

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

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

Initial Supporting table - WSSRoughRoadThres

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

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

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005

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	650	730	800	900	1,000	1,100	1,200	1,300	1,400	1,600	1,800	2,000	2,200
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	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800
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	650	730	800	900	1,000	1,100	1,200	1,300	1,400	1,600	1,800	2,000	2,200
65	-0.37	-0.12	0.13	0.51	0.99	0.93	1.07	0.75	0.30	-0.16	-0.21	0.08	0.26
75	-0.57	-0.52	-0.47	-0.39	-0.21	-0.52	-0.64	-0.65	-0.50	-0.46	0.19	0.58	0.46
85	-0.87	-0.82	-0.77	-0.89	-0.91	-1.12	-1.04	-1.40	-0.95	-0.31	0.19	-0.17	-0.19
95	-1.04	-0.99	-0.94	-1.08	-1.17	-1.79	-1.67	-1.80	-1.45	-1.11	-1.12	-1.12	-1.13
105	-1.04	-0.99	-0.94	-1.08	-1.17	-1.79	-1.67	-1.80	-1.45	-1.11	-1.12	-1.12	-1.13

ZeroTorqueEngLoad - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800
65	1.22	2.17	3.13	4.08	5.04	5.99	6.95	7.90	8.86	9.81	10.77	11.72	12.68
75	1.46	2.45	3.45	4.44	5.44	6.43	7.43	8.42	9.42	10.41	11.41	12.40	13.40
85	0.68	1.55	2.42	3.28	4.15	5.02	5.89	6.76	7.63	8.50	9.36	10.23	11.10
95	-0.18	0.76	1.71	2.65	3.60	4.55	5.49	6.44	7.39	8.33	9.28	10.22	11.17
105	-0.18	0.76	1.71	2.65	3.60	4.55	5.49	6.44	7.39	8.33	9.28	10.22	11.17

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

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

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

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

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

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

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

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

Initial Supporting table - P054E_IFM_MinFuelIdleC1_G

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

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	40.20	40.20	40.20	40.20	40.20
-10.04	29.03	29.03	29.03	29.03	29.03
-0.04	23.44	23.44	23.44	23.44	23.44
19.96	18.78	18.78	18.78	18.78	18.78
39.96	14.66	14.66	14.66	14.66	14.66
69.96	14.04	14.04	14.04	14.04	14.04

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	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	32.03	32.03	32.03	32.03	32.03
-10.04	19.45	19.45	19.45	19.45	19.45
-0.04	16.69	16.69	16.69	16.69	16.69
19.96	13.34	13.34	13.34	13.34	13.34
39.96	10.87	10.87	10.87	10.87	10.87
69.96	10.23	10.23	10.23	10.23	10.23

Initial Supporting table - P054E_IFM_MinFuelIdleHC_G

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

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	40.20	40.20	40.20	40.20	40.20
-10.04	29.03	29.03	29.03	29.03	29.03
-0.04	23.44	23.44	23.44	23.44	23.44
19.96	18.78	18.78	18.78	18.78	18.78
39.96	14.66	14.66	14.66	14.66	14.66
69.96	15.44	15.44	15.44	15.44	15.44

Initial Supporting table - P054E_IFM_MinFuelIdleHC_PN

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

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	32.03	32.03	32.03	32.03	32.03
-10.04	19.45	19.45	19.45	19.45	19.45
-0.04	16.69	16.69	16.69	16.69	16.69
19.96	13.34	13.34	13.34	13.34	13.34
39.96	10.87	10.87	10.87	10.87	10.87
69.96	7.47	7.47	7.47	7.47	7.47

Initial Supporting table - P054E_IFM_MinFuelIdleT1_G

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	29.18	29.18	29.18	29.18	29.18
-10.04	24.42	24.42	24.42	24.42	24.42
-0.04	20.98	20.98	20.98	22.94	20.98
19.96	18.75	18.75	18.75	18.75	18.75
39.96	15.38	15.38	17.55	15.38	15.38
69.96	12.01	12.01	12.42	12.01	12.01

Initial Supporting table - P054E_IFM_MinFuelIdleT1_PN

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	15.33	15.33	15.33	15.33	15.33
-10.04	13.86	13.86	13.86	13.86	13.86
-0.04	9.78	9.78	9.78	9.78	9.78
19.96	10.60	10.60	10.60	10.60	10.60
39.96	6.58	6.58	6.58	6.58	6.58
69.96	5.77	5.77	5.77	5.77	5.77

Initial Supporting table - P054E_IFM_MinFuelIdleT2_G

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	29.18	29.18	29.18	29.18	29.18
-10.04	24.42	24.42	24.42	24.42	24.42
-0.04	20.98	20.98	20.98	22.94	20.98
19.96	18.75	18.75	18.75	18.75	18.75
39.96	15.38	15.38	17.55	15.38	15.38
69.96	12.01	12.01	12.42	12.01	12.01

Initial Supporting table - P054E_IFM_MinFuelIdleT2_PN

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	15.33	15.33	15.33	15.33	15.33
-10.04	13.86	13.86	13.86	13.86	13.86
-0.04	9.78	9.78	9.78	9.78	9.78
19.96	10.60	10.60	10.60	10.60	10.60
39.96	6.58	6.58	6.58	6.58	6.58
69.96	5.77	5.77	5.77	5.77	5.77

Initial Supporting table - P054E_IFM_MinFuelIdleT3_G

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	29.18	29.18	29.18	29.18	29.18
-10.04	24.42	24.42	24.42	24.42	24.42
-0.04	20.98	20.98	20.98	22.94	20.98
19.96	18.75	18.75	18.75	18.75	18.75
39.96	15.38	15.38	17.55	15.38	15.38
69.96	12.01	12.01	12.42	12.01	12.01

Initial Supporting table - P054E_IFM_MinFuelIdleT3_PN

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	15.33	15.33	15.33	15.33	15.33
-10.04	13.86	13.86	13.86	13.86	13.86
-0.04	9.78	9.78	9.78	9.78	9.78
19.96	10.60	10.60	10.60	10.60	10.60
39.96	6.58	6.58	6.58	6.58	6.58
69.96	5.77	5.77	5.77	5.77	5.77

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Fuel Idle Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: (Combustion Mode)

P054F_IFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

P054F_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

P054F_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	1

P054F_IFM_CombModesEnbl - Part 4

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

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	47.12	47.12	47.12	47.12	47.12
-10.04	38.32	38.32	38.32	38.32	38.32
-0.04	32.05	32.05	32.05	32.05	32.05
19.96	26.59	26.59	26.59	26.59	26.59
39.96	23.17	23.17	23.17	23.17	23.17
69.96	24.49	24.49	24.49	24.49	24.49

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	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	39.28	39.28	39.28	39.28	39.28
-10.04	34.25	34.25	34.25	34.25	34.25
-0.04	29.11	29.11	29.11	29.11	29.11
19.96	22.08	22.08	22.08	22.08	22.08
39.96	17.55	17.55	17.55	17.55	17.55
69.96	19.07	19.07	19.07	19.07	19.07

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_G

Description: During HC unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	47.12	47.12	47.12	47.12	47.12
-10.04	38.32	38.32	38.32	38.32	38.32
-0.04	32.05	32.05	32.05	32.05	32.05
19.96	26.59	26.59	26.59	26.59	26.59
39.96	23.17	23.17	23.17	23.17	23.17
69.96	29.88	29.88	29.88	29.88	29.88

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_PN

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

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	39.28	39.28	39.28	39.28	39.28
-10.04	34.25	34.25	34.25	34.25	34.25
-0.04	29.11	29.11	29.11	29.11	29.11
19.96	22.08	22.08	22.08	22.08	22.08
39.96	17.55	17.55	17.55	17.55	17.55
69.96	25.02	25.02	25.02	25.02	25.02

Initial Supporting table - P054F_IFM_MaxFuelIdleT1_G

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	59.88	59.88	59.88	59.88	59.88
-10.04	55.12	55.12	55.12	55.12	55.12
-0.04	51.67	51.67	51.67	53.64	51.67
19.96	49.45	49.45	49.45	49.45	49.45
39.96	46.08	46.08	48.26	46.08	46.08
69.96	42.70	42.70	43.13	42.70	42.70

Initial Supporting table - P054F_IFM_MaxFuelIdleT1_PN

Description: During SCR heating Mode 1 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	48.03	48.03	48.03	48.03	48.03
-10.04	46.56	46.56	46.56	46.56	46.56
-0.04	42.48	42.48	42.48	42.48	42.48
19.96	43.30	43.30	43.30	43.30	43.30
39.96	39.27	39.27	39.27	39.27	39.27
69.96	38.48	38.48	38.48	38.48	38.48

Initial Supporting table - P054F_IFM_MaxFuelIdleT2_G

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	59.88	59.88	59.88	59.88	59.88
-10.04	55.12	55.12	55.12	55.12	55.12
-0.04	51.67	51.67	51.67	53.64	51.67
19.96	49.45	49.45	49.45	49.45	49.45
39.96	46.08	46.08	48.26	46.08	46.08
69.96	42.70	42.70	43.13	42.70	42.70

Initial Supporting table - P054F_IFM_MaxFuelIdleT2_PN

Description: During SCR heating Mode 2 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	48.03	48.03	48.03	48.03	48.03
-10.04	46.56	46.56	46.56	46.56	46.56
-0.04	42.48	42.48	42.48	42.48	42.48
19.96	43.30	43.30	43.30	43.30	43.30
39.96	39.27	39.27	39.27	39.27	39.27
69.96	38.48	38.48	38.48	38.48	38.48

Initial Supporting table - P054F_IFM_MaxFuelIdleT3_G

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	59.88	59.88	59.88	59.88	59.88
-10.04	55.12	55.12	55.12	55.12	55.12
-0.04	51.67	51.67	51.67	53.64	51.67
19.96	49.45	49.45	49.45	49.45	49.45
39.96	46.08	46.08	48.26	46.08	46.08
69.96	42.70	42.70	43.13	42.70	42.70

Initial Supporting table - P054F_IFM_MaxFuelIdleT3_PN

Description: During SCR heating Mode 3 combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

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

y/x	511.00	730.00	800.00	1,200.00	1,600.00
-20.04	48.03	48.03	48.03	48.03	48.03
-10.04	46.56	46.56	46.56	46.56	46.56
-0.04	42.48	42.48	42.48	42.48	42.48
19.96	43.30	43.30	43.30	43.30	43.30
39.96	39.27	39.27	39.27	39.27	39.27
69.96	38.48	38.48	38.48	38.48	38.48

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-40	-7	10	20	55	69	90
1	27,000	17,400	13,100	10,350	2,500	2,500	2,500

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest0

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-40	-7	10	20	55	69	90
1	27,500	20,000	16,000	13,500	5,500	2,500	2,500

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

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

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	5	

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

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.026	0.026	0.050	0.350	0.450	0.550	0.750	1.000
1	0	0	1	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.026	0.026	0.050	0.350	0.450	0.550	0.750	1.000
1	0	0	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_b_SQA_EnblCMBR

Description: SQA combustion mode enable

KaFADC_b_SQA_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_C2	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean
1	1	0	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_C3	CeCMBR_e_SCR_Temp1	CeCMBR_e_SCR_Temp2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle
1	0	0	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_SCR_Temp3	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 4

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

Initial Supporting table - KaFADC_n_SQC_HiThrsh

Description: Engine speed high threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_HiThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	2,450	2,450	2,450	2,450
1	2,450	2,450	2,450	2,450
2	2,450	2,450	2,450	2,450
3	2,450	2,450	2,450	2,450
4	2,450	2,450	2,450	2,450

KaFADC_n_SQC_HiThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	2,450	2,450	2,450	2,450
1	2,450	2,450	2,450	2,450
2	2,450	2,450	2,450	2,450
3	2,450	2,450	2,450	2,450
4	2,450	2,450	2,450	2,450

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	2,450	2,450	2,450	
1	2,450	2,450	2,450	
2	2,450	2,450	2,450	
3	2,450	2,450	2,450	
4	2,450	2,450	2,450	

Initial Supporting table - KaFADC_n_SQC_LoThrsh

Description: Engine speed low threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_LoThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	1,400	1,400	1,400	1,400
1	1,400	1,400	1,400	1,400
2	1,400	1,400	1,400	1,400
3	1,400	1,400	1,400	1,400
4	1,400	1,400	1,400	1,400

KaFADC_n_SQC_LoThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	1,400	1,400	1,400	1,400
1	1,400	1,400	1,400	1,400
2	1,400	1,400	1,400	1,400
3	1,400	1,400	1,400	1,400
4	1,400	1,400	1,400	1,400

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,400	1,400	1,400	
1	1,400	1,400	1,400	
2	1,400	1,400	1,400	
3	1,400	1,400	1,400	
4	1,400	1,400	1,400	

Initial Supporting table - KtFADD_V_CB_MaxAuthMaxFuelReq

Description: High fuel request map threshold (engine speed dependent) to enable CB maximum authority diagnostic check.

y/x	1	2	3	4	5	6	7	8	9	10	11	12
1	256	256	256	256	256	256	256	256	256	256	256	256

Initial Supporting table - P2BAA RDP Min Press Drop

Description: This calibration is used to define the minimum expected pressure drop based on pump efficiency after that the injection is commanded. The input of this table is the motorpump average commanded duty cycle before the injection is commanded

Value Units: kPa
X Unit: %

y/x	45	46	48	50	51	52	54	55	57
1	75	70	65	61	58	55	51	48	44

Unique Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	214	122	90	90	90

Unique Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-214	-122	-90	-80	-80

Unique Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-120	-80	-70	-69	-40	0	40	44	45	60	75
-120	0	0	0	0	0	0	0	0	0	0	0
-78	0	0	0	0	0	0	0	0	0	0	0
-77	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
52	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Unique Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	214	122	90	90	90

Unique Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-214	-122	-90	-80	-80

Unique Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-120	-80	-70	-69	-40	0	40	44	45	60	75
-120	0	0	0	0	0	0	0	0	0	0	0
-78	0	0	0	0	0	0	0	0	0	0	0
-77	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
52	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Unique Supporting table - P0461 P2066 P2636 Transfer Pump Enable Time Table

Description: Data is TransferPumpOnTimeLimit (in seconds) and Axis is Fuel Level in % [Kt FLVC t XferFuelPmpOnTimLim]

Value Units: seconds
X Unit: percent

P0461 P2066 P2636 Transfer Pump Enable Time Table - Part 1

y/x	0	3	6	9	13	16	19	22	25	28	31	34	38	41	44	47	50
1	0	450	450	450	450	450	450	450	450	506	563	619	675	731	788	844	900

P0461 P2066 P2636 Transfer Pump Enable Time Table - Part 2

y/x	53	56	59	63	66	69	72	75	78	81	84	88	91	94	97	100	
1	956	1,013	1,069	1,125	1,181	1,238	1,294	1,350	1,406	1,463	1,519	1,575	1,631	1,688	1,744	1,800	

Unique Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Unique Supporting table - P129F Threshold High

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

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

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

Unique Supporting table - P129F Threshold Low

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

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

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

Unique Supporting table - P2635 Max Fuel Flow

Description: P2635 Maximum Fuel Flow Disable Criteria
Maximum allowed fuel flow values above which the diagnostic is disabled

Value Units: grams / second
X Unit: kilopascals [commanded fuel pressure]
Y Units: volts [device supply]

y/x	200	250	300	350	400	450	500	550	600
5	512	512	512	512	512	512	512	512	512
6	512	512	512	512	512	512	512	512	512
8	512	512	512	512	512	512	512	512	512
9	512	512	512	512	512	512	512	512	512
11	512	512	512	512	512	512	512	512	512
12	512	512	512	512	512	512	512	512	512
14	512	512	512	512	512	512	512	512	512
15	512	512	512	512	512	512	512	512	512
17	512	512	512	512	512	512	512	512	512
18	512	512	512	512	512	512	512	512	512
20	512	512	512	512	512	512	512	512	512
21	512	512	512	512	512	512	512	512	512
23	512	512	512	512	512	512	512	512	512
24	512	512	512	512	512	512	512	512	512
26	512	512	512	512	512	512	512	512	512
27	512	512	512	512	512	512	512	512	512
29	512	512	512	512	512	512	512	512	512

Unique Supporting table - P2635 Threshold High

Description: P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals
X Unit: kilopascals [commanded fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	40	40	40	40	40	40	40	40	40
2	40	40	40	40	40	40	40	40	40
3	40	40	40	40	40	40	40	40	40
5	40	40	40	40	40	40	40	40	40
6	40	40	40	40	40	40	40	40	40
8	40	40	40	40	40	40	40	40	40
9	40	40	40	40	40	40	40	40	40
11	40	40	40	40	40	40	40	40	40
12	40	40	40	40	40	40	40	40	40
14	40	40	40	40	40	40	40	40	40
15	40	40	40	40	40	40	40	40	40
17	40	40	40	40	40	40	40	40	40
18	40	40	40	40	40	40	40	40	40
20	40	40	40	40	40	40	40	40	40
21	40	40	40	40	40	40	40	40	40
23	40	40	40	40	40	40	40	40	40
24	40	40	40	40	40	40	40	40	40
26	40	40	40	40	40	40	40	40	40
27	40	40	40	40	40	40	40	40	40
29	40	40	40	40	40	40	40	40	40
30	40	40	40	40	40	40	40	40	40
32	40	40	40	40	40	40	40	40	40
33	40	40	40	40	40	40	40	40	40
35	40	40	40	40	40	40	40	40	40
36	40	40	40	40	40	40	40	40	40
38	40	40	40	40	40	40	40	40	40
39	40	40	40	40	40	40	40	40	40
41	40	40	40	40	40	40	40	40	40
42	40	40	40	40	40	40	40	40	40
44	40	40	40	40	40	40	40	40	40
45	40	40	40	40	40	40	40	40	40

Unique Supporting table - P2635 Threshold High

47	40	40	40	40	40	40	40	40	40
48	40	40	40	40	40	40	40	40	40

Unique Supporting table - P2635 Threshold Low

Description: P2635 Filtered Pressure Error Low Threshold [over-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals
X Unit: kilopascals [commanded fuel pressure]
Y Units: grams / second [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	-190	-190	-190	-190	-190	-190	-190	-190	-190
2	-190	-190	-190	-190	-190	-190	-190	-190	-190
3	-190	-190	-190	-190	-190	-190	-190	-190	-190
5	-190	-190	-190	-190	-190	-190	-190	-190	-190
6	-190	-190	-190	-190	-190	-190	-190	-190	-190
8	-190	-190	-190	-190	-190	-190	-190	-190	-190
9	-190	-190	-190	-190	-190	-190	-190	-190	-190
11	-190	-190	-190	-190	-190	-190	-190	-190	-190
12	-190	-190	-190	-190	-190	-190	-190	-190	-190
14	-190	-190	-190	-190	-190	-190	-190	-190	-190
15	-190	-190	-190	-190	-190	-190	-190	-190	-190
17	-190	-190	-190	-190	-190	-190	-190	-190	-190
18	-190	-190	-190	-190	-190	-190	-190	-190	-190
20	-190	-190	-190	-190	-190	-190	-190	-190	-190
21	-190	-190	-190	-190	-190	-190	-190	-190	-190
23	-190	-190	-190	-190	-190	-190	-190	-190	-190
24	-190	-190	-190	-190	-190	-190	-190	-190	-190
26	-190	-190	-190	-190	-190	-190	-190	-190	-190
27	-190	-190	-190	-190	-190	-190	-190	-190	-190
29	-190	-190	-190	-190	-190	-190	-190	-190	-190
30	-190	-190	-190	-190	-190	-190	-190	-190	-190
32	-190	-190	-190	-190	-190	-190	-190	-190	-190
33	-190	-190	-190	-190	-190	-190	-190	-190	-190
35	-190	-190	-190	-190	-190	-190	-190	-190	-190
36	-190	-190	-190	-190	-190	-190	-190	-190	-190
38	-190	-190	-190	-190	-190	-190	-190	-190	-190
39	-190	-190	-190	-190	-190	-190	-190	-190	-190
41	-190	-190	-190	-190	-190	-190	-190	-190	-190
42	-190	-190	-190	-190	-190	-190	-190	-190	-190
44	-190	-190	-190	-190	-190	-190	-190	-190	-190
45	-190	-190	-190	-190	-190	-190	-190	-190	-190

Unique Supporting table - P2635 Threshold Low

47	-190	-190	-190	-190	-190	-190	-190	-190	-190
48	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - P2160 range change delay time

Description: If the transmission range state changes, the transmission range state must be stable for this amount of time as part of the P2160 enable conditions.

X Unit: transmission fluid temperature DegC
Y Units: delay time seconds

y/x	-40.00	0.00	40.00
1	5.000	5.000	5.000

Initial Supporting table - P2161 range change delay time

Description: If the transmission range state changes, the transmission range state must be stable for this amount of time as part of the P2161 enable conditions.

X Unit: transmission fluid temperature DegC
Y Units: delay time seconds

y/x	-40.00	-20.00	40.00
1	5.000	5.000	5.000

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions	Time Required			Mil Illum.
Transmission Control Module (TCM)	P0601	Transmission Electro-Hydraulic Control Module Read Only Memory	Incorrect program/calibrations checksum	=	TRUE	Boolean			>=	5	Fail Counts	One Trip
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0601 ECM: None				
Transmission Control Module (TCM)	P0603	Transmission Electro-Hydraulic Control Module Long-Term Memory Reset	Non-volatile memory (static or dynamic) checksum failure at Powerup	=	TRUE	Boolean				Runs Continously		One Trip
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0603 ECM: None				
Transmission Control Module (TCM)	P0604	Transmission Electro-Hydraulic Control Module Random Access Memory	RAM Read/Write Failure (Single Word)	=	TRUE	Boolean			>=	5	Fail Counts	One Trip
									=	16	Sample Counts	
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0604 ECM: None				
Transmission Control Module (TCM)	P062F	Transmission Electro-Hydraulic Control Module Long Term Memory Performance	TCM Non-Volatile Memory bit Incorrect flag at Powerdown	=	TRUE	Boolean				Runs Continously		One Trip
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P062F ECM: None				
Transmission Control Module (TCM)	P0634	Transmission Electro-Hydraulic Control Module Internal Temperature Too High	Fail Case 1 Substrate Temperature	>=	142.1015625	ºC			>=	5	Fail Time (Sec)	One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Fail Case 2					
			Substrate Temperature	>= 50 ºC			>= 2 Fail Time (Sec)	
			Ignition Voltage	>= 18 Volts				
			Note: either fail case can set the DTC					
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Substrate Temp Lo	>= 0 ºC		
					Substrate Temp Hi	<= 170 ºC		
					Substrate Temp Between Temp Range for Time	>= 0.25 Sec		
					P0634 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
High Side Driver 1	P0658	Actuator Supply Voltage Circuit Low	The HWIO reports a low voltage (open or ground short) error flag	= TRUE Boolean			>= 4 Fail Counts out of 6 Sample Counts	One Trip
					P0658 Status is not	= Test Failed This Key On or Fault Active		
					High Side Driver 1 On	= True Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P0667	TCM Internal Temp (substrate) Sensor Circuit Range/Performance	If transmission oil temp to substrate temp Δ	> Refer to Table 19 in supporting documents ºC				Two Trips
			If TCM substrate temp to power up temp Δ	> Refer to Table 20 in supporting documents ºC				
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.				>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until				>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)	
					Engine Torque Signal Valid	= TRUE Boolean		
					Accelerator Position Signal Valid	= TRUE Boolean		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Brake torque active	= FALSE		
					Below describes the brake torque entry criteria			
					Engine Torque	>= 90 N*m		
					Throttle	>= 30.000305 Pct		
					Transmission Input Speed	<= 200 RPM		
					Vehicle Speed	<= 8 Kph		
					Transmission Range	≠ Park		
					Transmission Range	≠ Neutral		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					PTO	= Not Active		
					Set Brake Torque Active TRUE if above conditions are met for:	>= 7 sec		
					Below describes the brake torque exit criteria			
					Brake torque entry criteria	= Not Met		
					Clutch hydraulic pressure	≠ Clutch Hydraulic Air Purge Event		
					Clutch used to exit brake torque active	= CeTFTD_e_C3_RatlEnbl		
					The above clutch pressure is greater than this value for one loop	>= 600 kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>= 20 Sec		
					P0667 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Control Module (TCM)	P0668	TCM internal temperature (substrate) thermistor failed at a low voltge	Type of Sensor Used	= CeTFTI_e_VoltageDirectProp				Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If TCM Substrate Temperature Sensor = Direct Proportional and Temp	<=	-249	ºC								
			If TCM Substrate Temperature Sensor = Indirect Proportional and Temp	>=	-249	ºC								
			Either condition above will satisfy the fail conditions								>=	60	Fail Timer (Sec)	
							Ignition Voltage Lo	>=	8.5996094	Volts				
							Ignition Voltage Hi	<=	31.999023	Volts				
							Engine Speed Lo	>=	400	RPM				
							Engine Speed Hi	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
							P0668 Status is	≠	Test Failed This Key On or Fault Active					
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						
Transmission Control Module (TCM)	P0669	TCM internal temperature (substrate) thermistor failed at a high voltage	Type of Sensor Used	=	CeTFTI_e_VoltageDirectProp									Two Trips
			If TCM Substrate Temperature Sensor = Direct Proportional and Temp	>=	249	ºC								
			If TCM Substrate Temperature Sensor = Indirect Proportional and Temp	<=	249	ºC								
			Either condition above will satisfy the fail conditions								>=	60	Fail Timer (Sec)	
							Ignition Voltage Lo	>=	8.5996094	Volts				
							Ignition Voltage Hi	<=	31.999023	Volts				
							Engine Speed Lo	>=	400	RPM				
							Engine Speed Hi	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value		Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
						P0669 Status is	≠	Test Failed This Key On or Fault Active					
						For Hybrids, below conditions must also be met							
						Estimated Motor Power Loss	>=	0	kW				
						Estimated Motor Power Loss greater than limit for time	>=	0	Sec				
						Lost Communication with Hybrid Processor Control Module	=	FALSE					
						Estimated Motor Power Loss Fault	=	FALSE					
				Disable Conditions:		MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None						
Transmission Control Module (TCM)	P06AC	TCM Power-up Temp Sensor Circuit Range/Performance	If TCM power-up temp to substrate temp Δ	> Refer to Table 20 in supporting documents	ºC								Two Trips
			If transmission oil temp to power up temp Δ	> Refer to Table 18 in supporting documents	ºC								
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.							>=	3000	Fail Counts (100ms loop)	
										Out of	3750	Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until							>=	700	Pass Counts (100ms loop)	
										Out of	875	Sample Counts (100ms loop)	
						Engine Torque Signal Valid	=	TRUE	Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Accelerator Position Signal Valid	=	TRUE	Boolean		
					Ignition Voltage Lo	>=	8.5996094	Volts		
					Ignition Voltage Hi	<=	31.999023	Volts		
					Engine Speed Lo	>=	400	RPM		
					Engine Speed Hi	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Brake torque active	=	FALSE			
					Below describes the brake torque entry criteria					
					Engine Torque	>=	90	N*m		
					Throttle	>=	30.000305	Pct		
					Transmission Input Speed	<=	200	RPM		
					Vehicle Speed	<=	8	Kph		
					Transmission Range	≠	Park			
					Transmission Range	≠	Neutral			
					PTO	=	Not Active			
					Set Brake Torque Active TRUE if above conditions are met for:	>=	7	sec		
					Below describes the brake torque exit criteria					
					Brake torque entry criteria	=	Not Met			
					Clutch hydraulic pressure	≠	Clutch Hydraulic Air Purge Event			
					Clutch used to exit brake torque active	=	CeTFTD_e_C3_RatlEnbl			
					The above clutch pressure is greater than this value for one loop	>=	600	kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>=	20	Sec		
					P06AC Status is	≠	Test Failed This Key On or Fault Active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E						
Transmission Control Module (TCM)	P06AD	TCM power-up thermistor circuit voltage low	Power Up Temp	<=	-59	ºC					>=	60	Fail Time (Sec)	Two Trips
							Ignition Voltage Lo	>=	8.5996094	Volts				
							Ignition Voltage Hi	<=	31.999023	Volts				
							Engine Speed Lo	>=	400	RPM				
							Engine Speed Hi	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
							P06AD Status is	≠	Test Failed This Key On or Fault Active					
							For Hybrids, below conditions must also be met							
							Estimated Motor Power Loss	>=	0	kW				
							Estimated Motor Power Loss greater than limit for time	>=	0	Sec				
							Lost Communication with Hybrid Processor Control Module	=	FALSE					
							Estimated Motor Power Loss Fault	=	FALSE					
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None						
Transmission Control Module (TCM)	P06AE	TCM power-up thermistor circuit voltage high	Power Up Temp	>=	164	ºC					>=	60	Fail Time (Sec)	Two Trips
							Ignition Voltage Lo	>=	8.5996094	Volts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P06AE Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Fluid Temperature Sensor (TFT)	P0711	Trans Fluid Temp Sensor Circuit Range/Performance	If transmission oil temp to substrate temp Δ	> Refer to Table 19 in supporting documents ºC				Two Trips
			If transmission oil temp to power up temp Δ	> Refer to Table 18 in supporting documents ºC				
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.				>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until				>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)	
					Engine Torque Signal Valid	= TRUE Boolean		
					Accelerator Position Signal Valid	= TRUE Boolean		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Engine Speed Hi	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Brake torque active	=	FALSE			
					Below describes the brake torque entry criteria					
					Engine Torque	>=	90	N*m		
					Throttle	>=	30.000305	Pct		
					Transmission Input Speed	<=	200	RPM		
					Vehicle Speed	<=	8	Kph		
					Transmission Range	≠	Park			
					Transmission Range	≠	Neutral			
					PTO	=	Not Active			
					Set Brake Torque Active TRUE if above conditions are met for:	>=	7	sec		
					Below describes the brake torque exit criteria					
					Brake torque entry criteria	=	Not Met			
					Clutch hydraulic pressure	≠	Clutch Hydraulic Air Purge Event			
					Clutch used to exit brake torque active	=	CeTFTD_e_C3_RatlEnbl			
					The above clutch pressure is greater than this value for one loop	>=	600	kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>=	20	Sec		
					P0711 Status is	≠	Test Failed This Key On or Fault Active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Fluid Temperature Sensor (TFT)	P0712	Transmission fluid temperature thermistor failed at a low voltage	Type of Sensor Used	= CeTFTI_e_VoltageDirectProp				Two Trips
			If Transmission Fluid Temperature Sensor = Direct Proportional and Temp	<= -74 ºC				
			If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp	>= -74 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Time (Sec)	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0712 Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Fluid Temperature Sensor (TFT)	P0713	Transmission fluid temperature thermistor failed at a high voltage	Type of Sensor Used	= CeTFTI_e_VoltageDirectProp				Two Trips
			If Transmission Fluid Temperature Sensor = Direct Proportional and Temp	>= 174 ºC				
			If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp	<= 174 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Time (Sec)	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0713 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0713, P0716, P0717, P0722, P0723 ECM: None		
Transmission Input Speed Sensor (TISS)	P0716	Input Speed Sensor Performance	Transmission Input Speed Sensor Drops	>= 900 RPM			>= 0.8 Fail Time (Sec)	One Trip
					Engine Torque is	>= 0 N*m		
					Engine Torque is	<= 8191.875 N*m		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Vehicle Speed is	>= 10 Kph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Throttle Position is	>= 0 Pct		

					Transmission Input Speed is	>= 0 RPM		
					The previous requirement has been satisfied for	>= 0 Sec		

					The change (loop to loop) in transmission input speed is	< 8191.875 RPM/Loop		
					The previous requirement has been satisfied for	>= 0 Sec		
					Throttle Position Signal Valid	= TRUE Boolean		
					Engine Torque Signal Valid	= TRUE Boolean		
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					P0716 Status is not	= Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0717, P0752, P0973, P0974 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Transmission Input Speed Sensor (TISS)	P0717	Input Speed Sensor Circuit Low Voltage	Fail Case 1 Transmission Input Speed is	< 33 RPM			>= 4.5 Fail Time (Sec)	One Trip
			Fail Case 2 When P0722 DTC Status equal to Test Failed and Transmission Input Speed is	< 653.125 RPM	Controller uses a single power supply for the speed sensors	= 1 Boolean		
					Engine Torque is	>= 80 N*m		
					Engine Torque is	<= 8191.875 N*m		
					Vehicle Speed	>= 10 Kph		
					Engine Torque Signal Valid	= TRUE Boolean		
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
							P0717 Status is not	=	Test Failed This Key On or Fault Active					
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: P0722, P0723 ECM: P0101, P0102, P0103						
Transmission Output Speed Sensor (TOSS)	P0722	Output Speed Sensor Circuit Low Voltage	Transmission Output Speed Sensor Raw Speed	<=	35	RPM					>=	4.5	Fail Time (Sec)	One Trip
							P0722 Status is not	=	Test Failed This Key On or Fault Active					
							Transmission Input Speed Check	=	TRUE	Boolean				
							Engine Torque Check	=	TRUE	Boolean				
							Throttle Position	>=	8.0001831	Pct				
							Transmission Fluid Temperature	>=	-40	ºC				
							Disable this DTC if the PTO is active	=	1	Boolean				
							Engine Torque Signal Valid	=	TRUE	Boolean				
							Throttle Position Signal Valid	=	TRUE	Boolean				
							Ignition Voltage is	>=	8.5996094	Volts				
							Ignition Voltage is	<=	31.999023	Volts				
							Engine Speed is	>=	400	RPM				
							Engine Speed is	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
							Enable_Flags Defined Below							
							The Engine Torque Check is TRUE, if either of the two following conditions are TRUE							
							Engine Torque Condition 1							
							Range Shift Status	≠	Range shift completed	ENUM				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					OR			
					Transmission Range is	= Park or Neutral		
					Engine Torque is	>= 8191.75 N*m		
					Engine Torque is	<= 8191.75 N*m		
					Engine Torque Condition 2			
					Engine Torque is	>= 50 N*m		
					Engine Torque is	<= 8191.75 N*m		

					The Transmission Input Speed (TIS) Check is TRUE, if either of the two following conditions are TRUE			
					TIS Check Condition 1			
					Transmission Input Speed is	>= 653.125 RPM		
					Transmission Input Speed is	<= 5350 RPM		
					TIS Check Condition 2			
					Engine Speed without the brake applied is	>= 3200 RPM		
					Engine Speed with the brake applied is	>= 3200 RPM		
					Engine Speed is	<= 8191.875 RPM		
					Controller uses a single power supply for the speed sensors	= 1 Boolean		
					Powertrain Brake Pedal is Valid	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0723 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Transmission Output Speed Sensor (TOSS)	P0723	Output Speed Sensor Circuit Intermittent	Transmission Output Speed Sensor Raw Speed	>= 105 RPM			>= 0 Enable Time (Sec)	One Trip
			Output Speed Delta	<= 8192 RPM			>= 0 Enable Time (Sec)	
			Output Speed Drop	> 650 RPM			>= 1.5 Output Speed Drop Recovery Fail Time (Sec)	
			AND					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
			Transmission Range is =	Driven range (R,D)						
					---------------------- Range_Disable	=	FALSE	See Below		
					OR ----------------------					
					Neutral_Range_Enable	=	TRUE	See Below		
					And					
					Neutral_Speed_Enable are TRUE concurrently ----------------------	=	TRUE	See Below		
					Transmission_Range_Enable	=	TRUE	See Below		
					Transmission_Input_Speed_Enable	=	TRUE	See Below		
					No Change in Transfer Case Range (High <-> Low) for	>=	5	Seconds		
					P0723 Status is not	=	Test Failed This Key On or Fault Active			
					Disable this DTC if the PTO is active	=	1	Boolean		
					Ignition Voltage is	>=	8.5996094	Volts		
					Ignition Voltage is	<=	31.999023	Volts		
					Engine Speed is	>=	400	RPM		
					Engine Speed is	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Enable_Flags Defined Below					
					Transmission_Input_Speed_Enable is TRUE when either TIS Condition 1 or TIS Condition 2 is TRUE:					
					TIS Condition 1 is TRUE when both of the following conditions are satsified for	>=	0	Enable Time (Sec)		
					Input Speed Delta	<=	4095.875	RPM		
					Raw Input Speed	>=	500	RPM		
					TIS Condition 2 is TRUE when ALL of the next two conditions are satisfied					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions				Time Required	Mil Illum.
					Input Speed	=	0	RPM			
					A Single Power Supply is used for all speed sensors	=	TRUE	Boolean			

					Neutral_Range_Enable is TRUE when any of the next 3 conditions are TRUE						
					Transmission Range is	=	Neutral	ENUM			
					Transmission Range is	=	Reverse/Neutral Transitonal	ENUM			
					Transmission Range is	=	Neutral/Drive Transitional	ENUM			
					And when a drop occurs						
					Loop to Loop Drop of Transmission Output Speed is	>	650	RPM			

					Range_Disable is TRUE when any of the next three conditions are TRUE						
					Transmission Range is	=	Park	ENUM			
					Transmission Range is	=	Park/Reverse Transitonal	ENUM			
					Input Clutch is not	=	ON (Fully Applied)	ENUM			

					Neutral_Speed_Enable is TRUE when All of the next three conditions are satsified for	>	1.5	Seconds			
					Transmission Output Speed	>	130	RPM			
					The loop to loop change of the Transmission Output Speed is	<	20	RPM			
					The loop to loop change of the Transmission Output Speed is	>	-10	RPM			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Transmission_Range_Enable is TRUE when one of the next six conditions is TRUE			
					Transmission Range is	= Neutral ENUM		
					Transmission Range is	= Reverse/Neutral Transitional ENUM		
					Transmission Range is	= Neutral/Drive Transitional ENUM		
					Time since a driven range (R,D) has been selected	>= Table Based Time Please Refer to Table 21 in supporting documents Sec		
					Transmission Output Speed Sensor Raw Speed	>= 500 RPM		
					Output Speed when a fault was detected	>= 500 RPM		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0973, P0974, P0976, P0977 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Torque Converter Clutch (TCC)	P0741	TCC System Stuck OFF	TCC Pressure	>= 750 Kpa			>= 2 Enable Time (Sec)	Two Trips
			Either Condition (A) or (B) Must be Met					
			(A) TCC Slip Error @ TCC On Mode	>= Refer to Table 1 in Supporting Documents RPM			>= 5 Fail Time (Sec)	
			(B) TCC Slip @ Lock On Mode	>= 130 RPM			>= 5 Fail Time (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter						>=	2	TCC Stuck Off Fail Counter	
					TCC Mode	=	On or Lock					
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed	>=	400	RPM				
					Engine Speed	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					Engine Torque Lo	>=	50	N*m				
					Engine Torque Hi	<=	8191.875	N*m				
					Throttle Position Lo	>=	8.0001831	Pct				
					Throttle Position Hi	<=	99.998474	Pct				
					2nd Gear Ratio Lo	>=	2.1948242	Ratio				
					2nd Gear Ratio High	<=	2.5251465	Ratio				
					3rd Gear Ratio Lo	>=	1.4228516	Ratio				
					3rd Gear Ratio High	<=	1.637085	Ratio				
					4th Gear Ratio Lo	>=	1.069458	Ratio				
					4th Gear Ratio High	<=	1.2304688	Ratio				
					5th Gear Ratio Lo	>=	0.7905273	Ratio				
					5th Gear Ratio Hi	<=	0.9095459	Ratio				
					6th Gear Ratio Lo	>=	0.6230469	Ratio				
					6th Gear Ratio High	<=	0.7169189	Ratio				
					Transmission Fluid Temperature Lo	>=	-6.65625	ºC				
					Transmission Fluid Temperature Hi	<=	130	ºC				
					PTO Not Active	=	TRUE	Boolean				
					Engine Torque Signal Valid	=	TRUE	Boolean				
					Throttle Position Signal Valid	=	TRUE	Boolean				
					Dynamic Mode	=	FALSE	Boolean				
					P0741 Status is	≠	Test Failed This Key On or Fault Active					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P0742, P2763, P2764 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Torque Converter Clutch (TCC)	P0742	TCC System Stuck ON	TCC Slip Speed	>= -50 RPM				One Trip
			TCC Slip Speed	<= 13 RPM			>= 1.5 Fail Time (Sec)	
			If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter				>= 6 Fail Counter	
					TCC Mode	= Off		
					Enable test if Cmnd Gear = 1stFW and value true	= 1 Boolean		
					Enable test if Cmnd Gear = 2nd and value true	= 0 Boolean		
					Engine Speed Hi	<= 6000 RPM		
					Engine Speed Lo	>= 500 RPM		
					Vehicle Speed HI	<= 511 KPH		
					Vehicle Speed Lo	>= 1 KPH		
					Engine Torque Hi	<= 8191.875 Nm		
					Engine Torque Lo	>= 80 Nm		
					Current Range	≠ Neutral Range		
					Current Range	≠ Reverse Range		
					Transmission Sump Temperature	<= 130 ºC		
					Transmission Sump Temperature	>= 18 ºC		
					Throttle Position Hyst High	>= 5.0003052 Pct		
					AND			
					Max Vehicle Speed to Meet Throttle Enable	<= 8 KPH		
					Once Hyst High has been met, the enable will remain while Throttle Position	>= 2.0004272 Pct		
					Disable for Throttle Position	>= 75 Pct		
					Disable if PTO active and value true	= 1 Boolean		
					Disable if in D1 and value true	= 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
					Disable if in D2 and value true	=	1	Boolean				
					Disable if in D3 and value true	=	1	Boolean				
					Disable if in D4 and value true	=	1	Boolean				
					Disable if in D5 and value true	=	1	Boolean				
					Disable if in MUMD and value true	=	1	Boolean				
					Disable if in TUTD and value true	=	1	Boolean				
					4 Wheel Drive Low Active	=	FALSE	Boolean				
					Disable if Air Purge active and value false	=	0	Boolean				
					RVT Diagnostic Active	=	FALSE	Boolean				
					Ignition Voltage	>=	8.5996094	V				
					Ignition Voltage	<=	31.999023	V				
					Vehicle Speed	<=	511	KPH				
					Engine Speed	>=	400	RPM				
					Engine Speed	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					Engine Torque Signal Valid	=	TRUE	Boolean				
					Throttle Position Signal Valid	=	TRUE	Boolean				
					P0742 Status is	≠	Test Failed This Key On or Fault Active					
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P0741, P2763, P2764 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E						
Mode 2 Multiplex Valve	P0751	Shift Solenoid Valve A Stuck Off	Commaned Gear Slip	>= 400 RPM								Two Trips
			Commanded Gear	= 1st Lock rpm								
			Gear Ratio	<= 1.209594727					>=	0.2	Fail Tmr	
			Gear Ratio	>= 1.094360352					=	5	Fail Counts	
			If the above parameters are true									

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							≠ 0 Neutral Timer (Sec)	
							>= 0.3 Fail Timer (Sec)	
							>= 8 Counts	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Range Shift State	= Range Shift Completed ENUM		
					TPS	>= 0.5004883 %		
					OR			
					Output Speed	>= 67 RPM		
					Throttle Position Signal Valid from ECM	= TRUE Boolean		
					Engine Torque Signal Valid from ECM, High side driver is enabled	= TRUE Boolean		
					High-Side Driver is Enabled	= TRUE Boolean		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E		
						ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Mode 2 Multiplex Valve	P0752	Shift Solenoid Valve A Stuck On	Gear Box Slip	>= 400 RPM				One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Commanded Gear	= 3rd Gear				
			Commanded Gear has Achieved 1st Locked OR 1st Free-Wheel OR 2nd with Mode 2 Sol. Commanded On	= TRUE Boolean				
			If the above parameters are true				>= Please Refer to Table 16 in Supporting Documents Neutral Timer (Sec)	
			Command 4th Gear once Output Shaft Speed	<= 400 RPM				
			If Gear Ratio	>= 3.825683594				
			And Gear Ratio	<= 4.228393555				
							>= 1.5 Fail Timer (Sec)	
							>= 5 Counts	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High-Side Driver is Enabled	= TRUE Boolean		
					Throttle Position Signal Valid from ECM	= TRUE Boolean		
					Output Speed	>= 67 RPM		
					OR			
					TPS	>= 0.5004883 %		
					Range Shift State	= Range Shift Completed ENUM		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Mode 2 Multiplex Valve	P0756	Shift Solenoid Valve B Stuck Off	Fail Case 1 Commanded Gear	= 1st Locked				One Trip
			Gear Box Slip	>= 400 RPM			>= Please Refer to Table 5 in Supporting Documents Neutral Timer (Sec)	
			Intrusive Shift to 2nd					
			Commanded Gear Previous	= 1st Locked Gear				
			Gear Ratio	<= 2.482177734				
			Gear Ratio	>= 2.245849609				
			If the above parameters are true				>= 1 sec	
							>= 3 counts	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Output Speed	>= 67 RPM		
					OR			
					TPS	>= 0.5004883 %		
					Range Shift State	= Range Shift Completed ENUM		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					High-Side Driver is Enabled	= TRUE Boolean		
					Throttle Position Signal Valid from ECM	= TRUE Boolean		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0776	Pressure Control (PC) Solenoid B Stuck Off [C35R]	Fail Case 1 Case: Steady State 3rd Gear Commanded Gear Gearbox Slip Command 4th Gear once Output Shaft Speed If Gear Ratio And Gear Ratio It the above condiations are true, Increment 3rd gear fail counter and C35R Fail counter	= 3rd Gear >= 400 RPM <= 400 RPM >= 1.094360352 <= 1.209594727			>= Please Refer to Table 16 in Supporting Documents Neutral Timer (Sec) >= 3 Fail Timer (Sec) >= 3 3rd Gear Fail Counts or >= 14 3-5R Clutch Fail Counts	One Trip
			Fail Case 2 Case: Steady State 5th Gear Commanded Gear Gearbox Slip Intrusive Test: Command 6th Gear If attained Gear=6th gear Time	= 5th Gear >= 400 Rpm >= Please refer to Table 3 in supporting documents Shift Time (Sec)			>= Please Refer to Table 5 in Supporting Documents Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			It the above condiations are true, Increment 5th gear fail counter				>= 3 5th Gear Fail Counts or	
			and C35R Fail counter				>= 14 3-5R Clutch Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 67 RPM		
					A OR B			
					(A) Output speed enable	>= 67 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E		
						ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0777	Pressure Control (PC) Solinoid B Stuck On [C35R] (Steady State)	<u>Fail Case 1</u> Case: Steady State 1st					One Trip
			Attained Gear slip	>= 400 RPM				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the Above is True for Time	>= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec)				
			Intrusive test: (CBR1 clutch exhausted)					
			Gear Ratio	<= 1.608642578				
			Gear Ratio	>= 1.455444336				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 2 Fail Count in 1st Gear	
							or	
							>= 3 Total Fail Counts	
			Fail Case 2 Case: Steady State 2nd gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.608642578				
			Gear Ratio	>= 1.455444336				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 3 Fail Count in 2nd Gear or >= 3 Total Fail Counts	
			Fail Case 3 Case: Steady State 4th gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C1234 clutch exhausted)					
			Gear Ratio	<= 0.89465332				
			Gear Ratio	>= 0.809448242				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 4th Gear or >= 3 Total Fail Counts	
			Fail Case 4 Case: Steady State 6th gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 0.89465332			>= 1.1 Fail Timer (Sec)	
			Gear Ratio	>= 0.809448242			>= 3 counts	
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 6th Gear	
							or	
							>= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 67 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 5.0003052 Pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
							if Attained Gear=1st FW Engine Torque Enable	>=	5	Nm		
							if Attained Gear=1st FW Engine Torque Enable	<=	8191.875	Nm		
							Transmission Fluid Temperature	>=	-6.65625	ºC		
							Input Speed Sensor fault	=	FALSE	Boolean		
							Output Speed Sensor fault	=	FALSE	Boolean		
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E				
								ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E				
Variable Bleed Solenoid (VBS)	P0777	Pressure Control (PC) Solenoid B StuckOn [C35R] (Dymanic)	Primary Offgoing Clutch is exhausted (See Table 12 in Supporting Documents for Exhaust Delay Timers)	=	TRUE	Boolean						One Trip
			Primary Oncoming Clutch Pressure Command Status	=	Maximum pressurized							
			Primary Offgoing Clutch Pressure Command Status	=	Clutch exhaust command							
			Range Shift Status	≠	Initial Clutch Control							
			Attained Gear Slip	<=	40	RPM						
			If the above conditions are true run appropriate Fail 1 Timers Below:									
			fail timer 1 (3-1 shifting with Closed Throttle)	>=	0.5	Fail Time (Sec)						
			fail timer 1 (3-2 shifting with Throttle)	>=	0.299804688	Fail Time (Sec)						
			fail timer 1 (3-2 shifting with Closed Throttle)	>=	0.5	Fail Time (Sec)						
			fail timer 1 (3-4 shifting with Throttle)	>=	0.299804688	Fail Time (Sec)						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (3-4shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-5 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (3-5 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-4 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (5-4 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-6 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (5-6 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			3rd gear fail counter				>= 3 3rd gear fail counts	
							OR	
			5th gear fail counter				>= 3 5th gear fail counts	
							OR	
			Total fail counter				>= 5 total fail counts	
					TUT Enable temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					output speed limit for TUT	>= 100 RPM		
					input speed limit for TUT	>= 150 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0796	Pressure Control (PC) Solenoid C Stuck Off [C456] (Steady State)	Fail Case 1 Case: Steady State 4th Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear ≠5th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 4th Gear Fail Counter				>= 3 4th Gear Fail Count OR	
			and C456 Fail Counters				>= 14 C456 Fail Counts	
			Fail Case 2 Case: Steady State 5th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Intrusive test: commanded 6th gear					
			If attained Gear ≠ 6th for time	>= Please Refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 5th Gear Fail Counter				>= 3 5th Gear Fail Count OR	
			and C456 Fail Counters				>= 14 C456 Fail Counts	
			Fail Case 3 Case: Steady State 6th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear ≠ 5th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 6th Gear Fail Counter and C456 Fail Counter				>= 3 6th Gear Fail Count OR	
			and C456 Fail Counter				>= 14 C456 Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 67 RPM		
					A OR B			
					(A) Output speed enable	>= 67 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					OutputSpeed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0797	Pressure Control (PC) Solenoid C Stuck On [C456] (Steady State)	Fail Case 1 Case: Steady State 1st					One Trip
			Attained Gear slip	>= 400 RPM				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec)				
			Intrusive test: (CBR1 clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 2 Fail Count in 1st Gear or >= 3 Total Fail Counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Fail Case 2 Case Steady State 2nd					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 2nd Gear or	
							>= 3 Total fail counts	
			Fail Case 3 Case Steady State 3rd					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 3rd Gear	
							OR	
							>= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 67 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 5.0003052 Pct		
					if Attained Gear=1st FW Engine Torque Enable	>= 5 Nm		
					if Attained Gear=1st FW Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E		
						ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0797	Pressure Control (PC) Solenoid C Stuck On [C456] (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 11 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized				
			Primary Offgoing Clutch Pressure Command Status	= Clutch exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 40 RPM				
			If the above conditions are true increment appropriate Fail 1 Timers Below:					
			fail timer 1 (4-1 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (4-1 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (4-2 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (4-2 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (4-3 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (4-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (5-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (6-2 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (6-2 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			4th gear fail counter				>= 3 Fail Counter From 4th Gear OR	
			5th gear fail counter				>= 3 Fail Counter From 5th Gear OR	
			6th gear fail counter				>= 3 Fail Counter From 6th Gear OR	
			Total fail counter				>= 5 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 100 RPM		
					input speed limit for TUT	>= 150 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria		Threshold Value			Secondary Malfunction	Enable Conditions	Time Required			Mil Illum.
							Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E				
Tap Up Tap Down Switch (TUTD)	P0815	Upshift Switch Circuit	Fail Case 1	Tap Up Switch Stuck in the Up Position in Range 1 Enabled	=	0	Boolean						Special No MIL
				Tap Up Switch Stuck in the Up Position in Range 2 Enabled	=	0	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 3 Enabled	=	0	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 4 Enabled	=	0	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 5 Enabled	=	0	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 6 Enabled	=	0	Boolean						
				Tap Up Switch Stuck in the Up Position in Neutral Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Park Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Reverse Enabled	=	0	Boolean						
				Tap Up Switch ON	=	TRUE	Boolean			>=	1	Fail Time (Sec)	
			Fail Case 2	Tap Up Switch Stuck in the Up Position in Range 1 Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 2 Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 3 Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 4 Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 5 Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Range 6 Enabled	=	1	Boolean						
				Tap Up Switch Stuck in the Up Position in Neutral Enabled	=	0	Boolean						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Tap Up Switch Stuck in the Up Position in Park Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Reverse Enabled	= 0 Boolean				
			Tap Up Switch ON	= TRUE Boolean				
			NOTE: Both Failcase1 and Failcase 2 Must Be Met				>= 600 Fail Time (Sec)	
					Time Since Last Range Change	>= 1 Enable Time (Sec)		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0815 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0816, P0826, P182E, P1876, P1877, P1915, P1761 ECM: None		
Tap Up Tap Down Switch (TUTD)	P0816	Downshift Switch Circuit	Fail Case 1 Tap Down Switch Stuck in the Down Position in Range 1 Enabled	= 0 Boolean				Special No MIL
			Tap Down Switch Stuck in the Down Position in Range 2 Enabled	= 0 Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions	Time Required			Mil Illum.
			Tap Down Switch Stuck in the Down Position in Range 3 Enabled	=	0	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 4 Enabled	=	0	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 5 Enabled	=	0	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 6 Enabled	=	0	Boolean						
			Tap Down Switch Stuck in the Down Position in Range Neutral Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range Park Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range Reverse Enabled	=	0	Boolean						
			Tap Down Switch ON	=	TRUE	Boolean			>=	1	sec	
			Fail Case 2 Tap Down Switch Stuck in the Down Position in Range 1 Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 2 Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 3 Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 4 Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 5 Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Range 6 Enabled	=	1	Boolean						
			Tap Down Switch Stuck in the Down Position in Neutral Enabled	=	0	Boolean						
			Tap Down Switch Stuck in the Down Position in Park Enabled	=	0	Boolean						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Tap Down Switch Stuck in the Down Position in Reverse Enabled	= 0 Boolean				
			Tap Down Switch ON NOTE: Both Failcase1 and Failcase 2 Must Be Met	= TRUE Boolean			>= 600 sec	
					Time Since Last Range Change	>= 1 Enable Time (Sec)		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0816 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0815, P0826, P182E, P1876, P1877, P1915, P1761 ECM: None		
Tap Up Tap Down Switch (TUTD)	P0826	Up and Down Shift Switch Circuit	TUTD Circuit Reads Invalid Voltage	= TRUE Boolean			>= 60 Fail Time (Sec)	Special No MIL
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P0826 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P1761 ECM: None		
Variable Bleed Solenoid (VBS)	P0961	Pressure Control (PC) Solenoid A Control Circuit Rationality Test (Line Pressure VBS)	The HWIO reports an invalid voltage (out of range) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0962	Pressure Control (PC) Solenoid A Control Circuit Low Voltage (Line Pressure VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 1.5 Fail Time (Sec) out of 1.875 Sample Time (Sec)	One Trip
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Variable Bleed Solenoid (VBS)	P0963	Pressure Control (PC) Solenoid A Control Circuit High Voltage (Line Pressure VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0966	Pressure Control (PC) Solenoid B Control Circuit Low Voltage (C35R VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0966 Status is not	= Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
Variable Bleed Solenoid (VBS)	P0967	Pressure Control (PC) Solenoid B Control Circuit High Voltage (C35R VBS)	The HWIO reports a high voltage (open or power short) error flag	=	TRUE	Boolean					>=	0.3	Fail Time (Sec)	One Trip
											out of	0.375	Sample Time (Sec)	
							Ignition Voltage	>=	8.5996094	Volts				
							Ignition Voltage	<=	31.999023	Volts				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
							P0967 Status is not	=	Test Failed This Key On or Fault Active					
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						
Variable Bleed Solenoid (VBS)	P0970	Pressure Control (PC) Solenoid C Control Circuit Low Voltage (C456/CBR1 VBS)	The HWIO reports a low voltage (ground short) error flag	=	TRUE	Boolean					>=	0.3	Fail Time (Sec)	One Trip
											out of	0.375	Sample Time (Sec)	
							P0970 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volts				
							Ignition Voltage	<=	31.999023	Volts				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
Variable Bleed Solenoid (VBS)	P0971	Pressure Control (PC) Solenoid C Control Circuit High Voltage (C456/CBR1 VBS)	The HWIO reports a high voltage (open or power short) error flag	=	TRUE	Boolean					>=	0.3	Fail Time (Sec)	One Trip
											out of	0.375	Sample Time (Sec)	
							P0971 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volts				
							Ignition Voltage	<=	31.999023	Volts				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						
Shift Solinoid	P0973	Shift Solenoid A Control Circuit Low (Mode 2 Solenoid)	The HWIO reports a low voltage (ground short) error flag	=	TRUE	Boolean					>=	1.2	Fail Time (Sec)	One Trip
											out of	1.5	Sample Time (Sec)	
							P0973 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volts				
							Ignition Voltage	<=	31.999023	Volts				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						
Shift Solinoid	P0974	Shift Solenoid A Control Circuit High (Mode 2 Solenoid)	The HWIO reports a high voltage (open or power short) error flag	=	TRUE	Boolean					>=	1.2	Fail Time (Sec)	Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
											out of	1.5	Sample Time (Sec)	
							P0974 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volts				
							Ignition Voltage	<=	31.999023	Volts				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						
Mode 3 Multiplex Valve	P0977	Shift Solenoid B Control Circuit High (Mode 3 Solenoid)	The HWIO reports a high voltage (open or power short) error flag	=	TRUE	Boolean					>=	1.2	Sec	One Trip
											out of	1.5	Sec	
							P0977 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volts				
							Ignition Voltage	<=	31.999023	Volts				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
				Disable Conditions:			MIL not Illuminated for DTC's:	TCM: None ECM: None						
Tap Up Tap Down Switch (TUTD)	P1761	Tap Up and Down switch signal circuit (rolling count)	Rolling count value received from BCM does not match expected value	=	TRUE	Boolean					>=	3	Fail Counter	Special No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							> 10 Sample Timer (Sec)	
					Tap Up Tap Down Message Health	= TRUE Boolean		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Internal Mode Switch (IMS)	P182E	Internal Mode Switch - Invalid Range	Fail Case 1 Current range	= Transition 1 (bit state 1110) Range				One Trip
			Previous range	≠ CeTRGR_e_PRNDL_Drive6 Range				
			Previous range	≠ CeTRGR_e_PRNDL_Drive5 Range				
			Range Shift State	= Range Shift Completed ENUM				
			Absolute Attained Gear Slip	<= 50 rpm				
			Attained Gear	<= Sixth				
			Attained Gear	>= First				
			Throttle Position Available	= TRUE				
			Throttle Position	>= 8.000183105 pct				
			Output Speed	>= 200 rpm				
			Engine Torque	>= 50 Nm				
			Engine Torque	<= 8191.75 Nm				
			If the above conditions are met then Increment Fail Timer				>= 1 Fail Seconds	
			If Fail Timer has Expired then Increment Fail Counter				>= 5 Fail Counts	
			Fail Case 2 Output Speed	<= 70 rpm				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			The following PRNDL sequence events occur in this exact order:											
			PRNDL state	=	Drive 6 (bit state 0110)	Range								
			PRNDL state = Drive 6 for	>=	1	Sec								
			PRNDL state	=	Transition 8 (bit state 0111)	Range								
			PRNDL state	=	Drive 6 (bit state 0110)	Range								
			PRNDL state	=	Transition 1 (bit state 1110)	Range								
			Above sequencing occurs in	<=	1	Sec								
			Neutral Idle Mode	=	Inactive									
			If all conditions above are met Increment delay Timer											
			If the below two conditions are met Increment Fail Timer								>=	3	Fail Seconds	
			delay timer	>=	1	Sec								
			Input Speed	>=	400	Sec								
			If Fail Timer has Expired then Increment Fail Counter								>=	2	Fail Counts	
			Fail Case 3											
			Current range	=	Transition 13 (bit state 0010)	Range	Previous range	≠	CeTRGR_ e_PRNDL_ Drive5					
			Engine Torque	>=	-8192	Nm	Previous range	≠	CeTRGR_ e_PRNDL_ Drive5					
			Engine Torque	<=	8191.75	Nm	IMS is 7 position configuration	=	0	Boolean				
			If the above conditions are met then, Increment Fail Timer				If the "IMS 7 Position config" = 1 then the "previous range" criteria above must also be satsified when the "current range" = "Transition 13"				>=	0.225	Seconds	
			If Fail Timer has Expired then Increment Fail Counter								>=	15	Fail Counts	
			Fail Case 4											
			Current range	=	Transition 8 (bit state 0111)	Range	Disable Fail Case 4 if last positive range was Drive 6 and current range is transition 8							
			Inhibit bit (see definition)	=	FALSE		Set inhibit bit true if PRNDL = 1100 (rev) or 0100 (Rev-Neu transition 11) Set inhibit bit false if PRNDL = 1001 (park)							

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions		Time Required			Mil Illum.
			Steady State Engine Torque	>=	100	Nm							
			Steady State Engine Torque	<=	8191.75	Nm							
			If the above conditions are met then Increment Fail Timer							>=	0.225	Seconds	
			If the above Condtions have been met, Increment Fail Counter							>=	15	Fail Counts	
			Fail Case 5 Throttle Position Available	=	TRUE	Boolean							
			The following PRNDL sequence events occur in this exact order:										
			PRNDL State	=	Reverse (bit state 1100)	Range							
			PRNDL State	=	Transition 11 (bit state 0100)	Range							
			PRNDL State	=	Neutral (bit state 0101)	Range							
			PRNDL State	=	Transition 11 (bit state 0100)	Range							
			Above sequencing occurs in	<=	1	Sec							
			Then delay timer increments										
			Delay timer	>=	5	sec							
			Range Shift State	=	Range Shift Complete								
			Absolute Attained Gear Slip	<=	50	rpm							
			Attained Gear	<=	Sixth								
			Attained Gear	>=	First								
			Throttle Position	>=	8.000183105	pct							
			Output Speed	>=	200	rpm							
			If the above conditions are met Increment Fail Timer							>=	20	Seconds	
			Fail Case 6 Current range	=	Illegal (bit state 0000 or 1000 or 0001)		A Open Circuit Definition (flag set false if the following conditions are met):						
			and				Current Range	≠	Transition 11 (bit state 0100)				
			A Open Circuit (See Definition)	=	FALSE	Boolean	or						
							Last positive state	≠	Neutral (bit state 0101)				
							or						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Previous transition state	≠ Transition 8 (bit state 0111)		
					Fail case 5 delay timer	= 0 sec		
			If the above Condtions are met then, Increment Fail timer				>= 6.25 Seconds	
			Fail Case 7					
			Current PRNDL State	= PRNDL circuit ABCP = 1101 Range				
			and					
			Previous PRNDL state	= PRNDL circuit ABCP =1111 Range				
			Input Speed	>= 150 RPM				
			Reverse Trans Ratio	<= 2.975952148 ratio				
			Reverse Trans Ratio	>= 3.423950195 ratio				
			If the above Condtions are met then, Increment Fail timer				>= 6.25 Seconds	
			P182E will report test fail when any of the above 7 fail cases are met					
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Engine Torque Signal Valid	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P07C0, P07BF, P077C, P077D ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Internal Mode Switch (IMS)	P1915	Internal Mode Switch Does Not Indicate Park/Neutral (P/N) During Start	PRNDL State is	≠ Park or Neutral Enumeration				One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			The following events must occur Sequentially					
			Initial Engine speed	<= 50 RPM			>= 0.25 Enable Time (Sec)	
			Then Engine Speed Between Following Cals					
			Engine Speed Lo Hist	>= 50 RPM				
			Engine Speed Hi Hist	<= 480 RPM			>= 0.06875 Enable Time (Sec)	
			Then					
			Final Engine Speed	>= 525 RPM				
			Final Transmission Input Speed	>= 100 RPM			>= 1.25 Fail Time (Sec)	
					DTC has Ran this Key Cycle?	= FALSE Boolean		
					Ignition Voltage Lo	>= 6 V		
					Ignition Voltage Hi	<= 31.999023 V		
					Ignition Voltage Hyst High (enables above this value)	>= 5 V		
					Ignition Voltage Hyst Low (disabled below this value)	<= 2 V		
					Transmission Output Speed	<= 90 rpm		
					P1915 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P2534	Ignition Switch Run/Start Position Circuit Low	TCM Run crank active (based on voltage thresholds below)	= FALSE Boolean				One Trip
			Ignition Voltage High Hyst (run crank goes true when above this value)	5 Volts			>= 280 Fail Counts (25ms loop)	
			Ignition Voltage Low Hyst (run crank goes false when below this value)	2 Volts			Out of 280 Sample Counts (25ms loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					ECM run/crank active status available	= TRUE Boolean		
					ECM run/crank active status	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P2535	Ignition Switch Run/Start Position Circuit High	TCM Run crank active (based on voltage thresholds below)	= TRUE Boolean				One Trip
			Ignition Voltage High Hyst (run crank goes true when above this value)	5 Volts			>= 280 Fail Counts (25ms loop)	
			Ignition Voltage Low Hyst (run crank goes false when below this value)	2 Volts			Out of 280 Sample Counts (25ms loop)	
					ECM run/crank active status available	= TRUE Boolean		
					ECM run/crank active status	= FALSE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2714	Pressure Control (PC) Solenoid D Stuck Off [CB26]	Fail Case 1 Case: Steady State 2nd Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 3rd gear					
			If attained Gear = 3rd for Time	>= Table Based Time Please see Table 2 in Supporting Documents Enable Time (Sec)				
			If Above Conditions have been met					
			Increment 2nd gear fail count				>= 3 2nd Gear Fail Count or	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			and CB26 Fail Count				>= 14 CB26 Fail Count	
			Fail Case 2 Case: Steady State 6th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear = 5th For Time	>= Table Based Time Please see Table 2 in Supporting Documents Enable Time (Sec)				
			If Above Conditions have been met, Increment 5th gear fail counter				>= 3 5th Gear Fail Count	
							or	
			and CB26 Fail Count				>= 14 CB26 Fail Count	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 0 RPM		
					A OR B			
					(A) Output speed enable	>= 67 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2715	Pressure Control (PC) Solenoid D Stuck On [CB26] (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 13 in Supporting Documents for Exhaust Delay Timers)	=	TRUE	Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	=	Maximum pressurized					
			Primary Offgoing Clutch Pressure Command Status	=	Clutch exhaust command					
			Range Shift Status	≠	Initial Clutch Control					
			Attained Gear Slip	<=	40	RPM				
			If above coditons are true, increment appropriate Fail 1 Timers Below:							
			fail timer 1 (2-1 shifting with throttle)	>=	0.299804688	Fail Time (Sec)				
			fail timer 1 (2-1 shifting without throttle)	>=	0.5	Fail Time (Sec)				
			fail timer 1 (2-3 shifting with throttle)	>=	0.299804688	Fail Time (Sec)				
			fail timer 1 (2-3 shifting without throttle)	>=	0.5	Fail Time (Sec)				
			fail timer 1 (2-4 shifting with throttle)	>=	0.299804688	Fail Time (Sec)				
			fail timer 1 (2-4 shifting without throttle)	>=	0.5	Fail Time (Sec)				
			fail timer 1 (6-4 shifting with throttle)	>=	0.299804688	Fail Time (Sec)				
			fail timer 1 (6-4 shifting without throttle)	>=	0.5	Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (6-5 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (6-5 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			2nd gear fail counter				>= 3 Fail Counter From 2nd Gear OR	
			6th gear fail counter				>= 3 Fail Counter From 6th Gear OR	
			total fail counter				>= 5 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 100 RPM		
					input speed limit for TUT	>= 150 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2715	Pressure Control (PC) Solenoid D Stuck On [CB26] (Steady State)	Fail Case 1 Case: Steady State 1st Attained Gear slip If the Above is True for Time Intrusive test: (CBR1 clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	>= 400 RPM >= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec) <= 2.482177734 >= 2.245849609			>= 1.1 Fail Timer (Sec) >= 5 Fail Count in 1st Gear or >= 5 Total Fail Counts	One Trip
			Fail Case 2 Case: Steady State 3rd Gear Max Delta Output Speed Hysteresis Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec >= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 2.482177734				
			Gear Ratio	>= 2.245849609				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 3rd Gear	
							or	
							>= 5 Total Fail Counts	
			Fail Case 3 Case: Steady State 4rd Gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C1234 clutch exhausted)					
			Gear Ratio	<= 0.700317383				
			Gear Ratio	>= 0.633666992				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 3 Fail Count in 4th Gear or >= 5 Total Fail Counts	
			<u>Fail Case 4</u> Case: Steady State 5th Gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	 <= 0.700317383 >= 0.633666992				
							>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 5th Gear or >= 5 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
					(A) Output speed enable	>=	67	Nm				
					(B) Accelerator Pedal enable	>=	0.5004883	Nm				
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed Lo	>=	400	RPM				
					Engine Speed Hi	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					if Attained Gear=1st FW Accelerator Pedal enable	>=	5.0003052	Pct				
					if Attained Gear=1st FW Engine Torque Enable	>=	5	Nm				
					if Attained Gear=1st FW Engine Torque Enable	<=	8191.875	Nm				
					Transmission Fluid Temperature	>=	-6.65625	ºC				
					Input Speed Sensor fault	=	FALSE	Boolean				
					Output Speed Sensor fault	=	FALSE	Boolean				
					Default Gear Option is not present	=	TRUE					
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E						
						ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E						
Variable Bleed Solenoid (VBS)	P2720	Pressure Control (PC) Solenoid D Control Circuit Low (CB26 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean					>=	0.3	Fail Time (Sec)	One Trip
									out of	0.375	Sample Time (Sec)	
					P2770 Status is not	=	Test Failed This Key On or Fault Active					
					Ignition Voltage	>=	8.5996094	Volts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2721	Pressure Control (PC) Solenoid D Control Circuit High (CB26 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2721 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2723	Pressure Control (PC) Solenoid E Stuck Off	Fail Case 1 Case: Steady State 1st Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 2nd gear					
			If attained Gear ≠ 2nd for Time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If Above Conditions have been met, Increment 1st gear fail counter				>= 3 1st Gear Fail Count	
			and C1234 fail counter				or >= 14 C1234 Clutch Fail Count	
			Fail Case 2 Case: Steady State 2nd Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 3rd gear					
			If attained Gear ≠ 3rd for Time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			If Above Conditions have been met, Increment 2nd gear fail counter				>= 3 2nd Gear Fail Count	
			and C1234 fail counter				or >= 14 C1234 Clutch Fail Count	
			Fail Case 3 Case: Steady State 3rd Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 4th gear					
			If attained Gear ≠ 4th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			If Above Conditions have been met, Increment 3rd gear fail counter				>= 3 3rd Gear Fail Count	
			and C1234 fail counter				or >= 14 C1234 Clutch Fail Count	
			Fail Case 4 Case: Steady State 4th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			Intrusive test: commanded 5th gear											
			If attained Gear = 5th For Time	>=	Please refer to Table 3 in Supporting Documents	Shift Time (Sec)								
			If Above Conditions have been met, Increment 4th gear fail counter								>=	3	4th Gear Fail Count	
													or	
			and C1234 fail counter								>=	14	C1234 Clutch Fail Count	
							PRNDL State defaulted	=	FALSE	Boolean				
							inhibit RVT	=	FALSE	Boolean				
							IMS fault pending indication	=	FALSE	Boolean				
							TPS validity flag	=	TRUE	Boolean				
							Hydraulic System Pressurized	=	TRUE	Boolean				
							Minimum output speed for RVT	>=	0	RPM				
							A OR B							
							(A) Output speed enable	>=	67	RPM				
							(B) Accelerator Pedal enable	>=	0.5004883	Pct				
							Common Enable Criteria							
							Ignition Voltage Lo	>=	8.5996094	Volts				
							Ignition Voltage Hi	<=	31.999023	Volts				
							Engine Speed Lo	>=	400	RPM				
							Engine Speed Hi	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
							Throttle Position Signal valid	=	TRUE	Boolean				
							HSD Enabled	=	TRUE	Boolean				
							Transmission Fluid Temperature	>=	-6.65625	ºC				
							Input Speed Sensor fault	=	FALSE	Boolean				
							Output Speed Sensor fault	=	FALSE	Boolean				
							Default Gear Option is not present	=	TRUE					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2724	Pressure Control (PC) Solenoid E Stuck On (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 10 in Supporting Documents for Exhaust Delay Timers)	=	TRUE	Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	=	Maximum pressurized					
			Primary Offgoing Clutch Pressure Command Status	=	Clutch exhaust command					
			Range Shift Status	≠	Initial Clutch Control					
			Attained Gear Slip	<=	40	RPM				
			If the above conditions are true increment appropriate Fail 1 Timers Below:							
			fail timer 1 (2-6 shifting with throttle)	>=	0.299804688	sec				
			fail timer 1 (2-6 shifting without throttle)	>=	0.5	sec				
			fail timer 1 (3-5 shifting with throttle)	>=	0.299804688	sec				
			fail timer 1 (3-5 shifting without throttle)	>=	0.5	sec				
			fail timer 1 (4-5 shifting with throttle)	>=	0.299804688	sec				
			fail timer 1 (4-5 shifting without throttle)	>=	0.5	sec				
			fail timer 1 (4-6 shifting with throttle)	>=	0.299804688	sec				
			fail timer 1 (4-6 shifting without throttle)	>=	0.5	sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers						>=	Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2	sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter									
			2nd gear fail counter						>=	3	Fail Counter From 2nd Gear	
			3rd gear fail counter						>=	3	Fail Counter From 3rd Gear	
			4th gear fail counter						>=	3	Fail Counter From 4th Gear	
			total fail counter						>=	5	Total Fail Counter	
					TUT Enable temperature	>=	-6.65625	ºC				
					Input Speed Sensor fault	=	FALSE	Boolean				
					Output Speed Sensor fault	=	FALSE	Boolean				
					Command / Attained Gear	≠	1st	Boolean				
					High Side Driver ON	=	TRUE	Boolean				
					output speed limit for TUT	>=	100	RPM				
					input speed limit for TUT	>=	150	RPM				
					PRNDL state defaulted	=	FALSE	Boolean				
					IMS Fault Pending	=	FALSE	Boolean				
					Service Fast Learn Mode	=	FALSE	Boolean				
					HSD Enabled	=	TRUE	Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2724	Pressure Control (PC) Solenoid E Stuck On (Steady State)	Fail Case 1 Case: 5th Gear					One Trip
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 5th Gear OR >= 3 Total Fail Counts	
			Fail Case 2 Case: 6th Gear					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true					
							>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 6th Gear	
							OR	
							>= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 67 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 5.0003052 Pct		
					if Attained Gear=1st FW Engine Torque Enable	>= 5 Nm		
					if Attained Gear=1st FW Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E		
						ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2729	Pressure Control (PC) Solenoid E Control Circuit Low (C1234 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec)	One Trip
							out of 0.375 Sample Time (Sec)	
					P2729 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None						
Variable Bleed Solenoid (VBS)	P2730	Pressure Control (PC) Solenoid E Control Circuit High (C1234 VBS)	The HWIO reports a high voltage (open or power short) error flag	=	TRUE	Boolean					>=	0.3	Fail Time (Sec)	One Trip
											out of	0.375	Sample Time (Sec)	
							P2730 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volt				
							Ignition Voltage	<=	31.999023	Volt				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
						Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None						
Variable Bleed Solenoid (VBS)	P2763	Torque Converter Clutch Pressure High	The HWIO reports a low pressure/high voltage (open or power short) error flag	=	TRUE	Boolean					>=	4.4	Fail Time (Sec)	Two Trips
											out of	5	Sample Time (Sec)	
							P2763 Status is not	=	Test Failed This Key On or Fault Active					
							Ignition Voltage	>=	8.5996094	Volt				
							Ignition Voltage	<=	31.999023	Volt				
							Engine Speed	>=	400	RPM				
							Engine Speed	<=	7500	RPM				
							Engine Speed is within the allowable limits for	>=	5	Sec				
							High Side Driver Enabled	=	TRUE	Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0659 ECM: None		
Variable Bleed Solenoid (VBS)	P2764	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low	The HWIO reports a high pressure/low voltage (ground short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	One Trip
					P2764 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High Side Driver Enabled	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0659 ECM: None		
Communication	U0073	Controller Area Network Bus Communication Error	CAN Hardware Circuitry Detects a Low Voltage Error	= TRUE Boolean			>= 62 Fail counts (≈ 10 seconds) Out of 70 Sample Counts (≈ 11 seconds)	One Trip
			Delay timer	>= 0.1125 sec				
					Stabilization delay	>= 3 sec		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Power Mode	= Run		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Communication	U0100	Lost Communications with ECM (Engine Control Module)	CAN messages from ECM are not received by the TCM	= TRUE Boolean			>= 12 sec	One Trip
					Stabilization delay	>= 3 sec		
					Ignition Voltage	>= 8.5996094 Volt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Ignition Voltage	<=	31.999023	Volt		
					Power Mode	=	Run			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: U0073 ECM: None				

2D Supporting Tables T43

Table 1

Axis	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00	N*m
Curve	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	RPM

Table 2

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.00	2.00	Sec

Table 3

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	4.00	4.00	Sec

Table 4

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.00	2.00	Sec

Table 5

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	3.00	3.00	Sec

Table 6

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.60	1.60	1.40	1.40	Sec

Table 7

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.40	1.40	1.30	1.20	Sec

2D Supporting Tables T43

Table 8

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.60	1.60	1.50	1.40	Sec

Table 9

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.30	1.30	1.20	1.10	Sec

Table 10

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	3.03	1.86	1.00	0.75	0.58	Sec

Table 11

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	1.72	1.11	0.60	0.36	0.22	Sec

Table 12

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	2.12	1.39	0.84	0.64	0.33	Sec

Table 13

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	2.51	0.95	0.50	0.29	0.13	Sec

Table 14

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	2.97	0.82	0.47	0.20	0.13	Sec

2D Supporting Tables T43

Table 15

Axis	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	ºC
Curve	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sec

Table 16

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.50	2.50	Sec

Table 17

Axis	-6.67	-6.66	40.00	ºC
Curve	0.40	0.35	0.30	Sec

Table 18

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	50.00	45.00	40.00	34.00	25.00	20.00	20.00	256.00	ºC

Table 19

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	50.00	45.00	40.00	34.00	25.00	20.00	20.00	256.00	ºC

Table 20

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	10.00	8.00	8.00	8.00	8.00	8.00	8.00	256.00	ºC

Table 21

Axis	-40.00	-20.00	40.00	ºC
Curve	5.00	3.00	1.00	Sec

2D Supporting Tables T43

Table 22

Axis	-6.67	-6.66	40.00	ºC
Curve	8191.75	8191.75	8191.75	RPM/Sec

Table 23

Axis	-6.67	-6.66	40.00	ºC
Curve	8191.75	8191.75	8191.75	RPM/Sec

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Transmission Fluid Temperature								
	P0711	This test detects performance of the transmission fluid temperature sensor by comparing changes in temperature from start up and between samples to calibration values.	All 5 Cases					B
					Not Test Failed This Key On	P0711 P0716 P0717 P0721 P0722 P0742 P077C P077D P07BF P07C0		
					No Fault Pending DTCs for this drive cycle	P0716 P0717 P0721 P0722 P077C P077D P07BF P07C0		
					No Pass DTCs for this drive cycle	P0711		
					No Fault Active DTC	P0711		
					Components powered AND Battery Voltage	 >= 9 V		
					Engine Speed between	200 RPM and 7500 RPM		
					for	5 seconds		
					Start-up transmission fluid temperature is available			
					Transmission fluid temperature between	-39 deg. C and 149 deg. C		
					ECT is not defaulted			
			Case 1 (Stuck sensor after cold start-up)				300 seconds	
			Start-up temperature change for a time	<= 2 deg. C >= 100 seconds	Start-up transmission fluid temperature between	-40 deg. C and 21 deg. C		
			AND		TCC Slip for a time	>= 120 RPM >= 300 seconds		
			Vehicle speed for a time	>= 8 KPH >= 300 seconds.	engine coolant temperature AND engine coolant temperature change from start-up	>= 70 deg. C >= 15 deg. C		
			Case 2 (Stuck sensor after warm start-up)				300 seconds	
			Start-up temperature change for a time	<= 3 deg. C >= 100 seconds	Start-up transmission fluid temperature between	115 deg. C and 150 deg. C.		
			AND		TCC Slip for a time engine coolant temperature AND	>= 120 RPM >= 300 seconds >= 70 deg. C		
			Vehicle speed for a time	>= 8 KPH >= 300 seconds.	engine coolant temperature change from start-up	>= 55 deg. C		
			Case 3 (Noisy sensor)				7 seconds	
			Change from previous temperature for in a time	>= 20 deg. C >= 14 events < 7 seconds.				
			Case 4 (Doesn't warm up to at least 20 deg. C)				2200 seconds	
			Time Enabled Criteria met AND AND Transmission Fluid Temperature	 < 20 deg. C.	net engine torque and vehicle speed and %throttle	>= 150 Nm <= 1492 Nm >= 22 KPH <= 511 KPH >= 10.0%		
			Time Enabled Criteria is determined by a lookup table ranging from	250 seconds when start-up temperature is >= 20 deg. C	and engine speed	<= 100% >= 500 RPM		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			to	2200 seconds when start-up temperature is <= -40 deg. C.	and engine coolant temperature and	<= 6500 RPM >= -39 deg. C <= 149 deg. C		
			Case 5 (Reasonableness at start-up): Engine Speed AND Engine Coolant Temperature AND for AND ((ABS(IAT-ECT) AND (TFT-ECT)) OR (ABS(IAT-ECT) AND (TFT-ECT)))	 > 500 RPM > -39 deg. C < 50 deg. C >= 2 seconds <= 6 deg. C > 40 deg. C > 6 deg. C > 60 deg. C.	Intake Air Temperature is not defaulted		2 seconds	
Transmission Fluid Temperature Sensor Circuit Low Input	P0712	Out of range low.	transmission fluid temperature for a time	>= 140 deg. C > 2.5 seconds.	Not Test Failed This Key On Components powered AND Battery Voltage Engine Speed between for	P0711 P0712 P0713 >= 9 V 200 RPM and 7500 RPM 5 seconds	2.5 seconds	B
Transmission Fluid Temperature Sensor Circuit High Input	P0713	Out of range high.	transmission fluid temperature for a time	<= - 40 deg. C > 2.5 seconds	Not Test Failed This Key On Components powered AND Battery Voltage Engine Speed between for IF Engine run time THEN Engine Coolant Temperature AND not defaulted for a time	P0711 P0712 P0713 >= 9 V 200 RPM and 7500 RPM 5 seconds <= 600 seconds must be > 20 deg. C >= 20 seconds.	2.5 seconds	B
Speed Sensors								
Input/Turbine Speed Sensor Circuit Range/Performance	P0716	This test detects large changes in Input Speed and noisy Input Speed by comparing to calibration values.	All cases		Not Test Failed This Key On No Fault Pending DTCs for this drive cycle. Not Low Voltage Disable	P0716 P0717 P07BF P07C0		A
			Case 1: (Unrealistically large changes in input speed) Change of Input Speed between samples for AND NOT Low Voltage Response	 >= 800 RPM >= 0.15 seconds			0.15 seconds	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Case 2: (Noisy Input Speed) For sample size IF the change in Input Speed THEN the Low Counter is incremented IF the change in Input 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			2 seconds	
Input/Turbine Speed Sensor Circuit No Signal	P0717	This test detects unrealistically low value of input/turbine speed or unrealistically large changes in input/turbine speed.	Failure pending if transmission input speed This test fails if input speed AND output speed for a time AND NOT Low Voltage Response	< 61 RPM < 61 RPM > 500 RPM > 1 second.	Not Test Failed This Key On No Fault Pending DTCs NOT Low Voltage Disable Engine is running Reverse-to-Neutral shift not in process Shifting complete Range attained is not neutral Transmission fluid temperature Engine speed Transmission output speed	P0717 P0729 P0731 P0732 P0733 P0734 P0735 P0736 P0721 P0722 P0716 P07BF P07C0 P077C P077D P0721 P0722 P07BF P07C0 P077C P077D > -25 deg. C >= 400 RPM >= 150 RPM	1 second	A
Output Speed Sensor Circuit Range/Performance	P0721	This test detects a noisy output speed sensor or circuit by detecting large changes in output speed.	Case 1: (Unrealistically large change in output speed) Change in output speed for a time AND NOT Low Voltage Response Case 2: (Noisy output speed) For sample size IF the change in output speed THEN the Low Counter is incremented. IF the change in output speed THEN the High Counter is incremented. Test fails if both the Low Counter and OR	 >= 500 RPM >= 0.15 seconds 80 <= -500 RPM >= 500 RPM >= 5	All Cases Not Test Failed This Key On No Fault Pending DTCs for this drive cycle NOT Low Voltage Disable range attained NOT neutral	 P0721 P0722 P077C P077D	Case 1: 0.15 seconds Case 2: 2 seconds	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			the Low Counter OR the High Counter	>= 5 >= 5				
Output Speed Sensor Circuit No Signal	P0722	This test detects unrealistically low value of output speed or unrealistically large change in output speed.	All Cases		All Cases Not Test Failed This Key On No Fault Pending DTCs for this drive NOT Low Voltage Disable	 P0721 P0722 P077C P077D P077C P077D		A
			Case 1: (Unrealistically large change in output speed) Failure pending if change in output speed Failure sets if range attained is Neutral	 >= 600 RPM	Test enabled when output speed for a time Test disabled when output speed for a time	>= 600 RPM >= 1 seconds <= 600 RPM > 1 seconds	1 second	
			Case 2: (Unrealistically low value of output speed) Failure pending if output speed Failure sets if not monitoring for low speed neutral and output speed AND range is 3rd, 4th, 5th, or 6th for a time AND NOT Low Voltage Response Failure sets if not monitoring for low speed neutral and output speed AND ((net engine torque OR net engine torque) OR (turbine speed AND range is 2nd)) for a time AND NOT Low Voltage Response	< 61 RPM < 61 RPM > 1 second < 61 RPM < -100 Nm > 100 Nm > 1500 RPM >= 4 seconds.	Not Test Failed This Key On No Fault Pending DTCs for this drive Engine is running Shift not in process Range attained is not Neutral Reverse to Neutral shift not in process Transmission fluid temperature Transmission input speed Not waiting for Manual Selector Valve to attain forward range PRNDL State is NOT D4, NOT Transitional D4	P0729 P0731 P0732 P0733 P0734 P0735 P0736 P0716 P0717 P07BF P07C0 P0716 P0717 P07BF P07C0 > -25 deg. C >= 1050 RPM	4 seconds	
Input/Turbine Speed Sensor Ckt Voltage Low	P07BF	This test detects either open or short to ground circuit malfunctions.	IF voltage for THEN increment fail timer IF fail timer AND Engine Speed AND NOT Low Voltage Response THEN report malfunction	<= 0.25 volts 0.2 second >= 4 counts >= 20 rpm	Not Test Failed This Key On OR No Fault Active DTC No Fault Active DTC NOT Low Voltage Disable	P07BF P07BF P07C0	0.8 sec	A
Input/Turbine Speed Sensor Ckt Voltage High	P07C0	This test detects either open or short to ground circuit malfunctions.	IF voltage for THEN increment fail timer IF fail timer AND Engine Speed THEN report malfunction	>= 4.75 0.2 second >= 4 counts >= 20 rpm	Not Test Failed This Key On OR No Fault Active DTC No Fault Active DTC Components powered AND Battery Voltage	P07C0 P07C0 P07BF >= 9 V	0.8 sec	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Output Speed Sensor Ckt Voltage Low	P077C	This test detects either open or short to ground circuit malfunctions.	IF voltage for THEN increment fail timer IF fail timer AND Engine Speed AND NOT Low Voltage Response THEN report malfunction	<= 0.25 volts 0.2 second >= 4 counts >= 20 rpm	Not Test Failed This Key On OR No Fault Active DTC No Fault Active DTC NOT Low Voltage Disable	P077C P077C P077D	0.8 sec	A
Output Speed Sensor Ckt Voltage High	P077D	This test detects either open or short to ground circuit malfunctions.	IF voltage for THEN increment fail timer IF fail timer AND Engine Speed THEN report malfunction	>= 4.75 0.2 second >= 4 counts >= 20 rpm	Not Test Failed This Key On OR No Fault Active DTC No Fault Active DTC Components powered AND Battery Voltage	P077D P077D P077C >= 9 V	0.8 sec	A
Range Verification								
Gear 1 Incorrect Ratio	P0731	This test verifies transmission operating ratio while 1st range is commanded by comparing computed ratio to the commanded ratio.	Pending failure occurs when accumulated event timer IF main pressure dropout is suspected THEN accumulated event timer is IF main pressure dropout is detected THEN accumulated event timer is Timer accumulates when transmission is in forward or reverse range AND output speed AND gear slip In response to pending failure, a diagnostic response range is commanded. During this command, this test fails if Abs(Converter Slip) for	>= 2 second >= 1 second >= 0.75 second >= 100 RPM > 100 RPM >= 250 RPM > 10 samples.	Not Test Failed This Key On (except if dropout suspected or detected) Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Test Failed This Key On No Fault Pending DTC for this drive cycle. NOT Low Voltage Disable No range switch response active Hydraulic System Pressurized Shift complete Output speed No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete	P0877 P0878 P0877 P0877 P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D P0717 P07BF P07C0 >= 200 RPM	2.25 seconds	A
Gear 2 Incorrect Ratio	P0732	This test verifies	Pending failure occurs when	>= 2 second			2.25 seconds	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		transmission operating ratio while 2nd range is commanded by comparing computed ratio to the commanded ratio.	accumulated event timer		Not Test Failed This Key On (except if dropout suspected or detected)	P0877 P0878		
			IF main pressure dropout is suspected THEN accumulated event timer is	>= 1 second				
			IF main pressure dropout is detected THEN accumulated event timer is	>= 0.75 second	Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877		
			Timer accumulates when transmission is in forward or reverse range		Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877		
			AND output speed	>= 100 RPM				
			AND gear slip	> 100 RPM	Not Test Failed This Key On	P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D		
			In response to pending failure, a diagnostic response range is commanded.					
			During this command, this test fails if Abs(Converter Slip) for	>= 250 RPM > 10 samples.	No Fault Pending DTC for this drive cycle.	P0717 P07BF P07C0		
					NOT Low Voltage Disable			
					No range switch response active			
					Hydraulic System Pressurized			
					Shift complete			
					Output speed	>= 200 RPM		
					No hydraulic default condition present			
					Normal powertrain shutdown not in process			
					Normal powertrain initialization is complete			
Gear 3 Incorrect Ratio	P0733	This test verifies transmission operating ratio while 3rd range is commanded by comparing computed ratio to the commanded ratio.	Pending failure occurs when accumulated event timer	>= 2 second	Not Test Failed This Key On (except if dropout suspect or detected)	P0877 P0878	2.25 seconds	A
			IF main pressure dropout is suspected THEN accumulated event timer is	>= 1 second				
			IF main pressure dropout is detected THEN accumulated event timer is	>= 0.75 second	Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877		
			Timer accumulates when transmission is in forward or reverse range		Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877		
			AND output speed	>= 100 RPM				
			AND gear slip	> 100 RPM	Not Test Failed This Key On	P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D		
			In response to pending failure, a diagnostic response range is commanded.					
			During this command, this test fails if Abs(Converter Slip) for	>= 250 RPM > 10 samples.				
					No Fault Pending DTC for this drive cycle.	P0717 P07BF P07C0		
					NOT Low Voltage Disable			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No range switch response active Hydraulic System Pressurized Shift complete Output speed No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete	 >= 200 RPM		
Gear 4 Incorrect Ratio	P0734	This test verifies transmission operating ratio while 4th range is commanded by comparing computed ratio to the commanded ratio.	Pending failure occurs when accumulated event timer IF main pressure dropout is suspected THEN accumulated event timer is IF main pressure dropout is detected THEN accumulated event timer is Timer accumulates when transmission is in forward or reverse range AND output speed AND gear slip In response to pending failure, a diagnostic response range is commanded. During this command, this test fails if Abs(Converter Slip) for	>= 2 second >= 1 second >= 0.75 second >= 100 RPM > 100 RPM >= 250 RPM > 10 samples.	Not Test Failed This Key On (except if dropout suspect or detected.) Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Test Failed This Key On No Fault Pending DTC for this drive cycle. NOT Low Voltage Disable No range switch response active Hydraulic System Pressurized Shift complete Output speed No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete	P0877 P0878 P0877 P0877 P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D P0717 P07BF P07C0 >= 200 RPM	2.25 seconds	A
Gear 5 Incorrect Ratio	P0735	This test verifies transmission operating ratio while 5th range is commanded by comparing computed ratio to the commanded ratio.	Pending failure occurs when accumulated event timer IF main pressure dropout is suspected THEN accumulated event timer is IF main pressure dropout is detected THEN accumulated event timer is Timer accumulates when transmission is in forward or reverse range AND output speed	>= 2 second >= 1 second >= 0.75 second >= 100 RPM	Not Test Failed This Key On (except if dropout suspect or detected.) Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877 P0878 P0877 P0877	2.25 seconds	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			gear slip	> 100 RPM				
			In response to pending failure, a diagnostic response range is commanded.		Not Test Failed This Key On	P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D		
			During this command, this test fails if Abs(Converter Slip) for	 >= 250 RPM > 10 samples.				
					No Fault Pending DTC for this drive cycle.	P0717 P07BF P07C0		
					NOT Low Voltage Disable			
					No range switch response active			
					Hydraulic System Pressurized			
					Shift complete			
					Output speed	>= 200 RPM		
					No hydraulic default condition present			
					Normal powertrain shutdown not in process			
					Normal powertrain initialization is complete			
Reverse Incorrect Ratio	P0736	This test verifies transmission range while reverse range is commanded by comparing computed ratio to the commanded ratio.	Accumulated event timer IF main pressure dropout is suspected THEN accumulated event timer is IF main pressure dropout is detected THEN accumulated event timer is	>= 2 seconds >= 1 second >= 0.75 second	Not Test Failed This Key On (except if dropout suspect or detected.)	P0877 P0878	2 seconds	A
					Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877		
			Timer accumulates when transmission is in forward or reverse range AND output speed AND gear slip	 >= 100 RPM > 100 RPM	Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict	P0877		
					Not Test Failed This Key On	P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D		
					No Fault Pending DTC for this drive cycle.	P0717 P07BF P07C0		
					NOT Low Voltage Disable			
					No range switch response active			
					Hydraulic System Pressurized			
					Shift complete			
					Output speed	>= 200 RPM		
					No hydraulic default condition present			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Normal powertrain shutdown not in process Normal powertrain initialization is complete			
Gear 6 Incorrect Ratio	P0729	This test verifies transmission range while 6th range is commanded by comparing computed ratio to the commanded ratio.	Pending failure occurs when accumulated event timer IF main pressure dropout is suspected THEN accumulated event timer is IF main pressure dropout is detected THEN accumulated event timer is Timer accumulates when transmission is in forward or reverse range AND output speed AND gear slip In response to pending failure, a diagnostic response range is commanded. During this command, this test fails if Abs(Converter Slip) for	>= 2 second >= 1 second >= 0.75 second >= 100 RPM > 100 RPM >= 250 RPM > 10 samples.	Not Test Failed This Key On (except if dropout suspect or detect) Not Fault Pending with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Fault Active with cmd gear Rev_Logic1 and RPS/PRNDL conflict Not Test Failed This Key On No Fault Pending DTC for this drive cycle. NOT Low Voltage Disable No range switch response active Hydraulic System Pressurized Shift complete Output speed No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete	P0877 P0878 P0877 P0877 P0721 P0722 P0716 P0717 P07BF P07C0 P077C P077D P0717 P07BF P07C0 >= 200 RPM	2.25 seconds	A
Torque Converter Clutch								
Torque Converter Clutch Circuit Performance or Stuck Off	P0741	This test detects the torque converter being stuck off (unlocked).	TCC Slip for a time	>= 80 RPM >= 15 seconds.	Not Test Failed This Key On No Fault Pending DTCs for this drive cycle.	P2761 P2763 P2764 P0721 P0722 P0716 P0717 P077C P077D P07BF P07C0 P2761 P2763 P2764 P0721 P0722 P0716 P0717 P077C P077D P07BF	15 seconds	B

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
						P07C0		
					Components powered			
					AND			
					Battery Voltage	>= 9 V		
					Engine Speed between	200 RPM and 7500 RPM		
					for	5 seconds		
					Must be in forward range			
					% Throttle	> 10 % and <= 90 %		
					Transmission fluid temperature	> 5 deg. C and < 130 deg. C		
					Time Since Range Change	>= 6 seconds		
					AND			
					TCC apply is complete			
					AND			
					TCC pressure	>= 1000 kPa		
Torque Converter Clutch Circuit Stuck On	P0742	This test detects the torque converter being stuck on (locked).	Case 1: (High Torque condition)		Not Test Failed This Key On	P2761 P2763 P2764 P0721 P0722 P0716 P0717 U0100 P077C P077D P07BF P07C0	Case 1: 2 Seconds	A
			Set fault pending when throttle	>= 70%				
			AND					
			net engine torque	>= 275 Nm.				
			Report malfunction when fault pending exists continuously					
			for a time	>= 2 seconds.				
			Case 2: (High Acceleration condition)		No Fault Pending DTCs for this drive cycle.	P2761 P2763 P2764 P0721 P0722 P0716 P0717 U0100 P077C P077D P07BF P07C0	Case 2: 5 Seconds	
			Set fault pending when output shaft acceleration	>= 100 RPM/second				
			Report malfunction when fault pending exists continuously					
			for a time	>= 5 seconds.				
					Components powered			
			Case 3: (Accel/Decel/Accel condition)		AND		Case 3: 4 Seconds	
					Battery Voltage	>= 9 V		
			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 7500 RPM		
					for	5 seconds		
					Engine speed not defaulted			
					Must be in forward range			
			for a time	>= 4 seconds	TCC is commanded off			
					TCC Slip	>=-20 RPM and <= 20 RPM		
			An output deceleration event occurs when output shaft acceleration is	<=-40 RPM/second				
			for a time	>= 2.5 seconds.	% Throttle	>= 25%		
					Net Engine Torque	>= 175 Nm		
					Engine speed	<= 3500 RPM		
					Input speed	<= 3500 RPM		
					Output speed	>= 100 RPM		
Pressure Switches								
Transmission Control System Performance	P0701	This test detects low	Case 1: Startup				15 seconds	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		main pressure at start up and low speed and detects loss of cooler line,	All pressure switches do not indicate pressure		Normal Initialization in process			
					transmission fluid temperature	> 25 deg C		
					NOT (Abnormal Powerdown prior to Initialization AND Commanded Gear NOT low speed neutral)			
					Engine Speed	> 500 rpm for 6 seconds		
						OR		
					Engine Speed	> 400 rpm for 15 seconds		
					PRNDL is not Park or Neutral	> 4 seconds		
			Case 2: Low Speed				5 sec max In Drive/ Rev w Vlv DO. If detect in Neu/Park (immediate upon select Drive or Rev)	
					Loss of Prime Enable	= TRUE (Boolean)		
			Pressure switch dropout is suspected if any below are true:		Hydraulic System Pressurized	= TRUE (Boolean)		
					Engine Speed	< 1600 rpm		
					Turbine Speed	< 1600 rpm		
			S1 logic valve integrity test pending AND S1 valve is NOT stroked for a time (S1_Vlv_DO = True)	> 0.099609 sec	Output Speed	< 750 rpm		
					Commanded Gear	Neutral, Reverse, First or		
					Park_Neu_Monitor_DO_Always	= TRUE (Boolean)		
			OR		Drive_Monitor_DO_Always	= TRUE (Boolean)		
			S1 logic valve timeout test pending AND S1 valve is NOT stroked for a time (S1_Vlv_TO_DO = True)	> 4.0 sec	Rev_Monotor_DO_Always	= TRUE (Boolean)		
			OR					
			S2 logic valve integrity test pending AND S2 valve is NOT stroked for a time (S2_Vlv_DO = True)	> 0.099609 sec				
			OR					
			S2 logic valve timeout test pending AND S1 valve is NOT stroked for a time (S2_Vlv_TO_DO = True)	> 4.0 sec				
			OR					
			S3 logic valve integrity test pending AND S3 valve is NOT stroked for a time (S3_Vlv_DO = True)	> 0.099609 sec				
			OR					
			S3 logic valve timeout test pending AND S3 valve is NOT stroked for a time (S3_Vlv_TO_DO = True)	> 4.0 sec				
			OR					
			RPS state is NOT REVERSE and PRNDL indicates a valid REVERSE for a time (RPS_DO = True)	> 0.099609 sec				
			Report fail (If sny below True):					
			Commanded Gear N5N or N0N:					
			S1_Vlv_Dropout_from_1_N and (S2_Vlv_DO or S3_Vlv_DO or	= TRUE (Boolean)				
			OR					
			S1_Vlv_DO and (S2_Vlv_DO or S3_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S2_Vlv_DO and (S1_Vlv_DO or S3_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S3_Vlv_DO and (S1_Vlv_DO or S2_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			RPS_DO and (S1_Vlv_DO or S2_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S1_Vlv_TO_DO and S2_Vlv_TO_DO or S3_Vlv_TO_DO or RPS_DO	= TRUE (Boolean)				
			OR					
			S2_Vlv_TO_DO and (S1_Vlv_TO_DO or S3_Vlv_TO_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S3_Vlv_TO_DO and (S1_Vlv_TO_DO or S2_Vlv_TO_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			RPS_DO and (S1_Vlv_TO_DO or S2_Vlv_TO_DO or S3_Vlv_TO_DO)	= TRUE (Boolean)				
			OR					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Commanded Gear 1_N:					
			S1_Vlv_DO and (S2_Vlv_DO or S3_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S2_Vlv_DO and (S1_Vlv_DO or S3_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S3_Vlv_DO and (S1_Vlv_DO or S2_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear 1_1:					
			(S2_Vlv_DO or S2_Vlv_TO_DO)	= TRUE (Boolean)				
			RPS_DO	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear 1_H:					
			S1_Vlv_DO and (S2_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			S2_Vlv_DO and (S1_Vlv_DO or RPS_DO)	= TRUE (Boolean)				
			OR					
			RPS_DO and (S1_Vlv_DO or S2_Vlv_DO)	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear R_N:					
			S1_Vlv_DO and (S2_Vlv_DO or S3_Vlv_DO)	= TRUE (Boolean)				
			OR					
			S2_Vlv_DO and (S1_Vlv_DO or S3_Vlv_DO)	= TRUE (Boolean)				
			OR					
			S3_Vlv_DO and (S1_Vlv_DO or S2_Vlv_DO)	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear R_Trim:					
			S2_Vlv_DO and S3_Vlv_DO	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear NLT:					
			Attained Gear is NLT for time	> 1 sec				
			RPS_DO	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear N03:					
			S1_Vlv_DO and RPS_DO	= TRUE (Boolean)				
			OR					
			Commanded Gear R_H:					
			S1_Vlv_DO and S2_Vlv_DO	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear R_1:					
			S2_Vlv_DO	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			OR					
			Commanded Gear N51:					
			S2_Vlv_DO and RPS_DO	= TRUE (Boolean)				
			OR					
			Commanded Gear 2_1:					
			S2_Vlv_DO and RPS_DO	= TRUE (Boolean)				
			Turbine Speed	> 400 rpm				
			Output Speed	< 600 rpm				
			3. Loss of Cooler Line				1.75 sec	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Loss of Cooler Line Dropout Status is Suspected when any of following conditions are TRUE. SS1_Integ_Destr AND SS1_Integ_Destr AND (SS2_Integ_Destr OR SS3_Integ_Destr OR SS2_Timeout_Failed_Stroking OR SS3_Timeout_Failed_Stroking OR RPS_Exh_Pending OR RPS_Exh_Failed OR (Pending_RVT AND (CNT_SS1_Integ_Dstrk >= thresh) OR (CNT_Pending_RVT >= thresh)) OR SS2_Integ_Destr AND (SS1_Integ_Destr OR SS3_Integ_Destr OR SS1_Timeout_Failed_Stroking OR SS3_Timeout_Failed_Stroking OR RPS_Exh_Pending OR RPS_Exh_Failed) OR SS3_Integ_Destr AND (SS1_Integ_Destr OR SS2_Integ_Destr OR SS1_Timeout_Failed_Stroking OR SS2_Timeout_Failed_Stroking OR RPS_Exh_Pending OR RPS_Exh_Failed) OR SS1_Timeout_Failed_Stroking AND (SS2_Integ_Destr OR SS3_Integ_Destr OR SS2_Timeout_Failed_Stroking OR SS3_Timeout_Failed_Stroking OR RPS_Exh_Pending OR RPS_Exh_Failed) OR SS2_Timeout_Failed_Stroking AND (SS1_Integ_Destr OR SS3_Integ_Destr OR SS1_Timeout_Failed_Stroking OR SS3_Timeout_Failed_Stroking OR RPS_Exh_Pending OR RPS_Exh_Failed) OR SS3_Timeout_Failed_Stroking AND (SS1_Integ_Destr OR SS2_Integ_Destr OR SS1_Timeout_Failed_Stroking OR SS2_Timeout_Failed_Stroking OR RPS_Exh_Pending OR RPS_Exh_Failed) OR RVT_DFG AND (RPS_Exh_Pending OR RPS_Exh_Failed OR SS1_Integ_Destr OR SS2_Integ_Destr OR SS3_Integ_Destr OR SS1_Timeout_Failed_Stroking OR SS2_Timeout_Failed_Stroking OR SS3_Timeout_Failed_Stroking) OR RPS_Exh_Failed AND	= TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) >= 2 counts >= 2 counts = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) =TRUE (Boolean) =TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean)	Loss_of_Cooler_Line_Detect_Enbl Seq_Diag_OvrRide_Mode OR Seq_Diag_OvrRide_Mode AND TFTKO OR Monitor_Loss_Cooler_Line_Logic_Valve_Timeout_Diag OR Monitor_Loss_Cooler_Line_Logic_Valve_Integrity_Diag	= TRUE (Boolean) Rng_Verif_Grp Rev_Press_Switch_Grp PS4_Ckt_Low = TRUE (Boolean) = TRUE (Boolean)	(with Ratio faults)	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			(SS1_Integ_Destr OR SS2_Integ_Destr OR SS3_Integ_Destr OR SS1_Timeout_Failed_Stroking OR SS2_Timeout_Failed_Stroking OR SS3_Timeout_Failed_Stroking) Loss of Cooler Line Dropout Status goes from Suspected to Detected when the following conditions are TRUE. RVT_for_Loss_of_Cooler_Line AND (Diag_OvrRide_Mode = Logic_Vlv_Int_Grp AND (Seq_Diag_OvrRideType == S1_Int_Failed_Destroked OR S2_Int_Failed_Destroked OR S3_Int_Failed_Destroked)) OR (Diag_OvrRide_Mode = Logic_Vlv_TO_Grp) OR (Seq_Diag_OvrRide_Mode = Rev_Press_Switch_Grp) OR (Seq_Diag_OvrRide_Mode = Rng_Verif_Grp) AND (((Seq_Diag_OvrRide_Type = 1st) AND TFTKO(1st)) OR ((Seq_Diag_OvrRide_Type = 2nd) AND TFTKO(2nd)) OR ((Seq_Diag_OvrRide_Type = 3rd) AND TFTKO(3rd)) OR ((Seq_Diag_OvrRide_Type = 4rth) AND TFTKO(4rth)) OR ((Seq_Diag_OvrRide_Type = 5th) AND TFTKO(5th)) OR ((Seq_Diag_OvrRide_Type = 6th) AND TFTKO(6th)) OR ((Seq_Diag_OvrRide_Type = Rvrs) AND TFTKO(Rvrs)))	= TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean) = TRUE (Boolean)				
Pressure Switch Solenoid 1 Circuit Low	P0842	This test compares the commanded valve position to the PS1 pressure switch 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	> 0.08 seconds P0973 P0752 15 times	S1 valve is destroked NOT Cold initialization unless transmission fluid temperature NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd	> -25 deg. C	80 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			indicate stroked.					
Shift Solenoid 1 (SS1) 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 12 seconds <= -40 deg. C	S1 valve commanded from destroked NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd		5 seconds	A
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)	> 6.2 seconds >= 0 deg. C. 10 seconds <= -40 deg. C	S1 valve commanded from stroked to destroked NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd		6.6 seconds	A
Pressure Switch Solenoid 1 Circuit High	P0843	This test compares the commanded valve position to the PS1 pressure switch feedback. (part of S1 valve integrity test)	Pending failure occurs when PS1 pressure switch indicates destroked for a time IF a main pressure dropout is suspected then time limit increases to 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.	> 0.07 seconds 5 seconds P0973 P0751 15 times	S1 valve is stroked NOT Cold initialization unless transmission fluid temperature NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd	> -25 deg. C	70 ms	A
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 IF a main pressure dropout is suspected then time limit increases to In response to the pending failure, S2 valve is retried by triggering S2 valve command to stroked and back to	> 0.04004 seconds 0.2998 seconds	S2 valve is destroked NOT Cold initialization unless transmission fluid temperature NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized	> -25 deg. C	40 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			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.	 P0976 P0757 2 times	NOT Hydraulic Default Cmd			
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. 12 seconds <= -40 deg. C.	S2 valve commanded from destroked to stroked. NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd		5 seconds	A
Shift Solenoid 2 Valve Performance – Stuck On	P0757	This test compares the commanded valve position to 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)	>= 6.5 seconds >= 0 deg. C. 22 seconds <= -40 deg. C.	S2 valve commanded from stroked to destroked NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd		6.5 sec	A
Pressure Switch Solenoid 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 IF a main pressure dropout is suspected, THEN time limit increases to 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),	> 0.30 seconds 5 seconds P0976 P0756	S2 valve is stroked NOT Cold initialization unless transmission fluid temperature NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd	 > -25 deg. C	300 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			S2 valve retry attempted AND PS2 pressure switch continues to indicate destroked.	2 times				
Pressure Switch Solenoid 3 Circuit Low	P0872	This test compares the commanded valve position to the PS3 pressure switch 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	S3 valve is destroked NOT Cold initialization unless transmission fluid temperature NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd	> -25 deg. C	20 ms	A
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. 12 seconds <= -40 deg. C.	S3 valve commanded from destroked to stroked. NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd		5 seconds	A
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)	> 6.5 seconds >= 0 deg. C. 22 seconds >= -40 deg. C.	S3 valve commanded from stroked to NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized NOT Hydraulic Default Cmd		6.6 seconds	A
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 IF a main pressure dropout is suspected THEN time limit increases to 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	> 0.30 seconds 5 seconds	S3 valve is stroked NOT Cold initialization unless transmission fluid temperature NOT Low Voltage Disable NOT Shutdown with Active Diag Hydraulic System Pressurized	> -25 deg. C	300 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			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.	 P0979 P0761 2 times	NOT Hydraulic Default Cmd			
Pressure Switch Reverse Circuit Low	P0877	This test detects Reverse Pressure Switch closed indication by comparing the Reverse Pressure Switch state to the PRNDL switch state.	Case 1: (Forward range) For a sample size (if dropout suspected, NLT or N02 cmded, 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, NLT or N02 cmded, 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 had been cranking or running this drive cycle Components powered AND Ignition Voltage between Engine Speed between for Transmission Fluid Temperature Hydraulic System Pressurized Reverse Pressure Switch State indicates REVERSE	 P0877 P0878 P0708 P0708 9 V and 18 V 200 RPM and 7500 RPM 5 seconds >= 0 deg. C	5 seconds	A
			Case 2: (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				
Pressure Switch Reverse Circuit High	P0878	This test detects the Reverse Pressure switch 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 No Fault Pending DTC for this drive cycle. No range switch response active	P0877 P0878 P0708 P0708		A
			Case 1: (RPS State and Gear Ratio do not agree) IF Rev Gear Ratio and RPS indicates for AND Engine Torque for report malfunction	 not Reverse >= 0.5 second >= 100 Nm >= 1 second	NOT Fault Active Ignition Voltage between First Range Commanded Shift Complete Output Speed	P0878 9 V and 18 V >= 100 rpm	1.5 seconds	
			For Case 2: (RPS Shutdown Test) If RPS indicates	 not Reverse	Power Mode is NOT Off Transmission Fluid Temperature	 >= 0 deg. C	10 seconds	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			for a time at transmission fluid temperature during engine shutdown This time varies with transmission fluid at transmission fluid temperature to time at transmission fluid temperature report malfunction at Init	> 10 seconds 0 deg. C. 3 seconds > 35 deg. C 12 seconds < -20 deg. C.	Engine had been cranking or running this drive cycle Engine speed Turbine speed Output speed	 < 50 RPM < 50 RPM < 50 RPM		
On-coming/Off-going Ratio								
Pressure Control Solenoid 1 Controlled Clutch 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 (For rough road conditions, use) 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 ABS(Converter slip) for sample size	>= 2 seconds 2 seconds >= 60 RPM > 75 RPM 150 RPM. >= 250 RPM > 10 samples	Not Test Failed This Key On Output Speed Turbine Speed Hydraulic System Pressurized Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch response active No Cold Mode operation No abusive garage shift to 1st range detected On-coming clutch control enabled Power downshift abort to previous range NOT active NOT Low Voltage Disable	P0721 P0722 P0716 P0717 P0877 P0878 P07BF P07C0 P077C P077D >= 125 RPM >= 60 RPM	2.25 seconds	A
Pressure Control Solenoid 2 Controlled Clutch 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 (For rough road conditions, use) 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 ABS(Converter slip) for sample size	>= 2 seconds 2 seconds >= 60 RPM > 75 RPM 150 RPM. >= 250 RPM > 10 samples	Not Test Failed This Key On Output Speed Turbine Speed Hydraulic System Pressurized Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete	P0721 P0722 P0716 P0717 P0877 P0878 P07BF P07C0 P077C P077D >= 125 RPM >= 60 RPM	2.25 seconds	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No range switch response active No Cold Mode operation No abusive garage shift to 1st range detected On-coming clutch control enabled Power downshift abort to previous range NOT active NOT Low Voltage Disable			
Pressure Control Solenoid 1 Controlled Clutch Stuck On	P2724	This test determines if the off-going clutch energized by Pressure Control solenoid 1 remains engaged during a forward range shift.	Accumulated fail timer for forward range upshift; OR accumulated fail timer for direction change shifts; 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 >= 3.0 seconds >= 0.500 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 response active No Cold Mode operation No abusive garage shift to 1st range detected NOT Low Voltage Disable	P0721 P0722 P0716 P0717 P0877 P0878 P07BF P07C0 P077C P077D >= 200 RPM >= 200 RPM	3 seconds	A
Pressure Control Solenoid 2 Controlled Clutch Stuck On	P0777	This test determines if the off-going clutch energized by Pressure Control solenoid 2 remains engaged during a forward range shift.	Accumulated fail timer for forward range upshift; OR accumulated fail timer for direction change shifts; 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 >= 3.0 seconds >= 0.500 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 response active No Cold Mode operation No abusive garage shift to 1st range detected	P0721 P0722 P0716 P0717 P0877 P0878 P07BF P07C0 P077C P077D >= 200 RPM >= 200 RPM	3 seconds	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					NOT Low Voltage Disable			
PRNDL/IMS								
Transmission Range Sensor High Input	P0708	This test monitors the transmission range switch for invalid input conditions and parity errors occurring over consecutive ignition cycles.	For Case 1 (No Information): Illegal electrical state for a time	>= 1 second	Components powered AND Battery Voltage	>= 9 V	Case 1: 1 second	A
			For Case 2 (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.		Engine Speed between	200 RPM and 7500 RPM	Case 2: 5th occurrence	
					for	5 seconds		
			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 Motion Detected; 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. Decrement Counter 3 IF No Parity Error Detected AND Valid Reverse Detected AND Motion Detected.					
			IF Counter 3, THEN report failure.	>= 5 counts				
			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;				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Valid Neutral Detected is defined as the 4-bit PRNDL indicates Valid Neutral for a time and output speed OR for a time.	 >= 0.2 seconds <= 20 RPM >= 3 seconds				
Transmission Range Sensor Circuit Range/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.	> 7 samples	Not Test Failed This Key On Ignition voltage between Powertrain State is READY or CRANKING Engine speed	P0706 9V and 18 V > 100 RPM and < 350 RPM.	200 ms	B
Solenoid Electrical								
Main Modulation/Line Pressure Control Solenoid Control Circuit Open	P0960	This test detects solenoid electrical open circuit malfunctions.	Fault pending is set on a single occurrence of hardware ground or open fault. IF either hardware faults are present for THEN initiate intrusive test by opening low side driver IF intrusive test indicates open for THEN report malfunction	A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. >= 3 counts >= 2 counts	Not Test Failed This Key On Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine speed High Side Driver 2 Enabled	P2669 P2670 P2671 >= 9 V < 4 seconds > 10 V >= 20 RPM	125 ms	A
Main Modulation/Line Pressure Control Solenoid Control Circuit Performance	P0961	This test detects the performance of the solenoid by comparing desired current to actual duty cycle	IF delta(desired current - actual current) FOR For a sample size THEN report malfunction	>= 0.5 amps >= 40 counts < 80 samples	Not Test Failed This Key On No Fault Pending DTC for this drive cycle.	P2669 P2670 P2671 P0960 P0961 P0962 P0960 P0962	1000 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine speed High Side Driver 2 Enabled Shift Complete Lockup Apply Complete OR Lockup Release Complete	 >= 9 V < 4 seconds > 10 V >= 20 RPM		
Main Modulation/Line Pressure Control Solenoid Control Circuit Low	P0962	This test detects solenoid electrical ground circuit malfunctions.	Fault pending is set on a single occurrence of hardware ground or open fault. IF either hardware faults are present for THEN initiate intrusive test by opening low side driver IF intrusive test indicates grnd for THEN report malfunction	A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. >= 3 counts >= 2 counts	Not Test Failed This Key On Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine speed High Side Driver 2 Enabled	P2669 P2670 P2671 >= 9 V < 4 seconds > 10 V >= 20 RPM	125 ms	A
Main Modulation/Line Pressure Control Solenoid Control Circuit High	P0963	This test detects solenoid electrical short to power circuit malfunctions.	Short to power fault present for	A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 1.16 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. > = 3 counts	Not Test Failed This Key On	P2669 P2670	75 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
						P2671		
					Components powered AND Battery Voltage	 >= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	 < 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 2 Enabled			
Pressure Control Solenoid 2 Control Circuit Open	P0964	This test detects solenoid electrical open circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			125 ms	A
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P0657 P0658 P0659		
			IF either hardware faults are present for THEN initiate intrusive test by opening low side driver	>= 3 counts	Components powered AND Battery Voltage	 >= 9 V		
			IF intrusive test indicates open for THEN report malfunction	>= 2 counts				
					If Engine Cranking, then Crank Time AND Battery Voltage	 < 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
Pressure Control Solenoid 2 Control Circuit Performance	P0965	This test detects the performance of the solenoid by comparing desired current to actual duty cycle			Not Test Failed This Key On	P0657 P0658 P0659 P0964 P0965 P0966	250ms	A
			IF delta(desired current - actual current) FOR	>= 0.5 amps >= 10 counts				
			For a sample size	< 20 samples				
			THEN report malfunction					
					No Fault Pending DTC for this drive cycle.	P0964 P0966		
					Components powered AND Battery Voltage	 >= 9 V		
					If Engine Cranking, then Crank Time AND	 < 4 seconds		
					Battery Voltage	> 10 V		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
					Shift Complete			
					Lockup Apply Complete OR Lockup Release Complete			
Pressure Control Solenoid 2 Control Circuit Low	P0966	This test detects solenoid electrical ground circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			125 ms	A
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P0657 P0658 P0659		
			IF either hardware faults are present for THEN initiate intrusive test by opening low side driver	>= 3 counts				
			IF intrusive test indicates grnd for THEN report malfunction	>= 2 counts				
					Components powered AND Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
Pressure Control Solenoid 2 Control Circuit High	P0967	This test detects solenoid electrical short to power circuit malfunctions.		A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 1.16 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			75 ms	A
					Not Test Failed This Key On	P0657 P0658 P0659 P0967		
			Short to power fault present for	> = 3 counts				
					Components powered AND Battery Voltage	>= 9 V		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					If Engine Cranking, then Crank Time AND Battery Voltage Engine speed High Side Driver 1 Enabled High Side Driver 1 Enabled	 < 4 seconds > 10 V >= 20 RPM		
Pressure Control Solenoid 1 Control Circuit Open	P2727	This test detects solenoid electrical open circuit malfunctions.	 Fault pending is set on a single occurrence of hardware ground or open fault. IF either hardware faults are present for THEN initiate intrusive test by opening low side driver IF intrusive test indicates open for THEN report malfunction	A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. >= 3 counts >= 2 counts	Not Test Failed This Key On Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine speed High Side Driver 2 Enabled	P2669 P2670 P2671 >= 9 V < 4 seconds > 10 V >= 20 RPM	125 ms	A
Pressure Control Solenoid 1 Control Circuit Performance	P2728	This test detects the performance of the solenoid by comparing desired current to actual duty cycle	IF delta(desired current - actual current) FOR For a sample size THEN report malfunction	>= 0.5 amps >= 10 counts < 20 samples	Not Test Failed This Key On No Fault Pending DTC for this drive cycle. Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine speed High Side Driver 2 Enabled Shift Complete	P2669 P2670 P2671 P2727 P2728 P2729 P2727 P2729 >= 9 V < 4 seconds > 10 V >= 20 RPM	250 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Lockup Apply Complete OR Lockup Release Complete			
Pressure Control Solenoid 1 Control Circuit Low	P2729	This test detects solenoid electrical ground circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			125 ms	A
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P2669 P2670 P2671		
			IF either hardware faults are present for THEN initiate intrusive test by opening low side driver	>= 3 counts	Components powered AND Battery Voltage	>= 9 V		
			IF intrusive test indicates grnd for THEN report malfunction	>= 2 counts	If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 2 Enabled			
Pressure Control Solenoid 1 Control Circuit High	P2730	This test detects solenoid electrical short to power circuit malfunctions.		A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 1.16 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			75 ms	A
			Short to power fault present for	> = 3 counts	Not Test Failed This Key On	P2669 P2670 P2671 P2730		
					Components powered AND Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 2 Enabled			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid 1 Control Circuit Low/Open	P0973	This test detects solenoid electrical ground and open circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.42 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. The nominal filter time to latch fault is 200 usec and the diagnostic threshold is 240 usec. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 200 kohms and shall not be detected if the circuit impedance is <= 6 kohms. The interface shall detect an open circuit condition when the driver is Off. The nominal filter time to latch fault is 200 usec and the diagnostic threshold is 240 usec.			250 ms	A
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P0657 P0658 P0659		
			IF either hardware fault is present for THEN report malfunction	>= 10 counts				
					Components powered AND Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
Shift Solenoid 1 Control Circuit High	P0974	This test detects solenoid electrical short to power circuit malfunctions.		A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.39 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. The nominal filter time to latch fault is 150 usec and the diagnostic threshold is 240 usec.			75 ms	A
					Not Test Failed This Key On	P0657 P0658 P0659 P0974		
			Short to power fault present for	> = 3 counts				
					Components powered AND Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid 2 Control Circuit Low/Open	P0976	This test detects solenoid electrical ground or open circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.42 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. The nominal filter time to latch fault is 200 usec and the diagnostic threshold is 240 usec. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 200 kohms and shall not be detected if the circuit impedance is <= 6 kohms. The interface shall detect an open circuit condition when the driver is Off. The nominal filter time to latch fault is 200 usec and the diagnostic threshold is 240 usec.			250 ms	A
			Fault pending is set on a single occurrence of hardware ground		Not Test Failed This Key On	P0657 P0658 P0659		
			IF either hardware fault is present for THEN report malfunction	>= 10 counts				
					Components powered AND Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
Shift Solenoid 2 Control Circuit High	P0977	This test detects solenoid electrical short to power circuit malfunctions.		A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.39 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. The nominal filter time to latch fault is 150 usec and the diagnostic threshold is 240 usec.			75 ms	A
					Not Test Failed This Key On	P0657 P0658 P0659 P0977		
			Short to power fault present for	> = 3 counts				
					Components powered AND Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	< 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Shift Solenoid 3 Control Circuit Low/Open	P0979	This test detects solenoid electrical ground or open circuit malfunctions.		A **ground short** condition shall be detected if the circuit attached to the Controller external connection has an impedance **<= 0.22 ohm** to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is **Off** . The nominal filter time to latch fault is 200 usec and the diagnostic threshold is 240 usec. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 200 kohms and shall not be detected if the circuit impedance is <= 6 kohms. The interface shall detect an open circuit condition when the driver is Off. The nominal filter time to latch fault is 200 usec and the diagnostic threshold is 240 usec.			250 ms	A
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P0657 P0658 P0659 P0979		
			IF either hardware fault is present for THEN report malfunction	>= 10 counts				
					Components powered AND Battery Voltage	 >= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	 < 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
Shift Solenoid 3 Control Circuit High	P0980	This test detects solenoid electrical short to power circuit malfunctions.		A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.39 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. The nominal filter time to latch fault is 150 usec and the diagnostic threshold is 240 usec.			75 ms	A
			Short to power fault present for	> = 3 counts	Not Test Failed This Key On	P0657 P0658 P0659 P0980		
					Components powered AND Battery Voltage	 >= 9 V		
					If Engine Cranking, then Crank Time AND Battery Voltage	 < 4 seconds > 10 V		
					Engine speed	>= 20 RPM		
					High Side Driver 1 Enabled			
Actuator Supply 1 (HSD1) Voltage Open	P0657	This test detects if					75 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		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.	IF HSD1 fault is indeterminate THEN initiate intrusive test Command intrusive gear. Override pressure control solenoid 2 THEN exit intrusive test after Report malfunction when the number of failure events A failure event occurs when the number of failed solenoids connected to HSD1	>= 0.075 sec > 0.050 sec >= 3 >= 2	Not Test Failed This Key On HSD1 is commanded ON Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine speed	P0657 >= 9 V < 4 seconds > 10 V >= 20 RPM		
Actuator Supply 1 (HSD1) Voltage Low	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	A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.43 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is On. Ground short is read every 10 us (fault filtering). Diagnostic time is 50 usec - every 50us (5 readings) with a minimum of 3 readings out of 5 to flag a short. >= 3 times	Not Test Failed This Key On HSD1 is commanded ON	P0658	75 ms	A
Actuator Supply 1 (HSD1) Voltage High	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 power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.5 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is Off. Power short is read every 10 us after power up reset (fault filtering). Diagnostic time is 50 usec - every 50us (5 readings) with a minimum of 3 readings out of 5. >= 3 times	During initialization Battery Voltage	>= 9V	18.75 ms	A
Actuator Supply2 (HSD2) Voltage Open	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 HSD1	>= 3 >= 2	Not Test Failed This Key On HSD2 is commanded ON Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine Speed	P2669 >= 9 V < 4 seconds > 10 V >= 20 rpm	75 ms	A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Actuator Supply2 (HSD2) Voltage Low	P2670	This test detects low voltage when high voltage is expected indicating a short to ground at the circuit.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.43 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is On. Ground short is read every 10 us (fault filtering). Diagnostic time is 50 usec - every 50us (5 readings) with a minimum of 3 readings out of 5 to flag a short.			75 ms	A
			Report malfunction when short to ground is detected for a number of events	>= 3 times	Not Test Failed This Key On	P2670		
					HSD2 is commanded ON			
Actuator Supply 2 (HSD2) Voltage High	P2671	This test detects if the voltage measured at the HSD 2 detection circuit indicates high during initialization (when the circuit is off)		A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.5 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is Off. Power short is read every 10 us after power up reset (fault filtering). Diagnostic time is 50 usec - every 50us (5 readings) with a minimum of 3 readings out of 5.			18.75 ms	A
			During initialization, report malfunction when the number of failure events	>= 3 times	During initialization			
					Battery Voltage	>= 9		
TCC Pressure Control Solenoid Control Circuit Open	P2761	This test detects torque converter solenoid electrical open circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			125 ms	B
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P2669 P2670 P2671		
			IF either hardware faults are present for THEN initiate intrusive test by opening low side driver	>= 3 counts	Components powered AND			
			IF intrusive test indicates open for THEN report malfunction	>= 2 counts	Battery Voltage	>= 9 V		
					If Engine Cranking, then Crank Time AND	< 4 seconds		
					Battery Voltage	> 10 V		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Engine Speed High Side Driver 2 Enabled	>= 20 rpm		
TCC Pressure Control Solenoid Control Circuit Performance	P2762	This test detects the performance of the solenoid by comparing desired current to actual duty cycle	IF delta(desired current - actual current) FOR For a sample size THEN report malfunction	>= 0.5 amps >= 40 counts < 80 samples	Not Test Failed This Key On No Fault Pending DTC for this drive cycle. Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine Speed High Side Driver 2 Enabled Shift Complete Lockup Apply Complete OR Lockup Release Complete	P2669 P2670 P2671 P2761 P2762 P2764 P2761 P2763 >= 9 V < 4 seconds > 10 V >= 20 rpm	1000 ms	B
TCC Pressure Control Solenoid Control Circuit High	P2763	This test detects solenoid electrical short to power circuit malfunctions.	Short to power fault present for	A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 1.16 ohm to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. The interface shall detect a power short condition when the driver is On. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. > = 3 counts	Not Test Failed This Key On Components powered AND Battery Voltage If Engine Cranking, then Crank Time AND Battery Voltage Engine Speed High Side Driver 2 Enabled	P2669 P2670 P2671 P2763 >= 9 V < 4 seconds > 10 V >= 20 rpm	75 ms	B

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
TCC Pressure Control Solenoid Control Circuit Low	P2764	This test detects solenoid electrical ground circuit malfunctions.		A ground short condition shall be detected if the circuit attached to the Controller external connection has an impedance <= 0.01 ohm to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The interface shall detect a ground short condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance >= 173 kohm and shall not be detected if the circuit impedance is <= 9.6 k ohm. The interface shall detect an open circuit condition when the driver is Off. There is 10 usec fault filter. The fault is checked for every 6.25 ms by application software.			125 ms	~~B~~ A
			Fault pending is set on a single occurrence of hardware ground or open fault.		Not Test Failed This Key On	P2669 P2670 P2671		
			IF either hardware faults are present for	>= 3 counts				
			THEN initiate intrusive test by opening low side driver		Components powered AND			
			IF intrusive test indicates grnd for	>= 2 counts	Battery Voltage	>= 9 V		
			THEN report malfunction					
					If Engine Cranking, then Crank Time	< 4 seconds		
					AND Battery Voltage	> 10 V		
					Engine Speed	>= 20 rpm		
					High Side Driver 2 Enabled			
Miscellaneous								
4 Wheel Drive Low Switch Circuit Malfunction	P2771	This test detects abnormal conditions for the four-wheel drive indication switch input by comparing switch state range to calculated range.	Case 1 (Stuck Off)		All Cases		0.5 second	B
			This test fails when, for number of occurrences,	>= 1	Not Test Failed This Key On	P2771 P0721 P0722 P077C P077D		
			the transfer case 4WD switch indicates High range and the calculated transfer case range is Low range for a time	>= 0.5 second				
					No Fault Active DTCs for this drive cycle	P2771 P0721 P0722 P077C P077D		
			Case 2 (Stuck On)		No Fault Pending DTCs for this drive cycle	P0721 P0722 P077C P077D		
			This test fails when, for number of occurrences,	>= 1				
			the transfer case 4WD switch indicates Low range and the calculated transfer case range is High range for a time	>= 0.5 second	NOT Tranfer Case failure suspect			
					Transfer Case is NOT Neutral or defaulted			
					Transmission fluid temperature	> 20 deg. C and < 130 deg. C		
					Engine Speed between	200 RPM and 7500 RPM		
					for	5 seconds		
					Shift complete AND range attained NOT Neutral			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Transmission Component Slipping	P0894	This test detects the number of turbine slip events during the Neutral Locked Turbine (NLT) request from engine controller.	For this ignition cycle, when the number of Neutral Locked Turbine (NLT) Slip events, then report fail Where number of NLT Slip events for this ignition cycle = Number of accumulated NLT Slip events – Number of NLT Slip events from previous ignition cycles. And, where number of accumulated NLT Slip events is incremented when commanded gear or attained gear is NLT AND turbine speed for a time	>= 3 > 50 RPM > 3 seconds.	Components powered AND Battery Voltage Engine Speed between for	 >= 9 V 200 RPM and 7500 RPM 5 seconds	8075 ms	B
Ignition Switch Run/Start Circuit	P2534	Out of range low.	Ignition voltage THEN increment fail counter IF fail counter AND (BattChargeSysStable TRUE OR NOT P0882) THEN report malfunction	< 5 volts >= 800 counts	Not Test Failed This Key On Components powered AND Battery Voltage Engine Speed between for	P2534 >= 9 V 200 RPM and 7500 RPM 5 seconds	5 seconds	A
GMLAN Bus Reset Counter Overrun	U0073	This test detects if the GMLAN bus is off for a calibration duration.	CAN Hardware Circuitry Detects a Bus Voltage Error (CAN bus off) Bus off delay time (use if Bus if Off from Bus Indeterminate State)	= TRUE (Boolean) >= 0.16 sec	>= 5 counts >= 5 counts all conditions A and (B or C) below must occur for stabilization time Bus Stabilization time A) Service mode $04 active and end of trip pocessing active A) normal serial data communication enabled A) U0073 status not B) secured controller or emission critical then use ignition voltage B) secured controller or emission critical Ignition Voltage B) Power Mode C) ignition off enable C) Power Mode C) battery voltage	 >= 5 seconds = FALSE (Boolean) = TRUE (Boolean) = fault active = CeCANR_e_OBDII_Dsbl (Boolean) >= 11 volts = Run = TRUE (Boolean) = accessory >11 volts		B
GMLAN ECM Controller State of Health Failure	U0100	This test detects GMLANbus failures by detecting State of Health failures in GMLAN messages $191, $0BE, $0C9,$1A1, $287, $2C3, $3B9, $3D1,$3E9, $3F9, $4C1, and $4F1 from ECM.	TCM Rx message missed frame TCM Rx frame message missed frame	 = TRUE (Boolean)	fail times are caculated based on Rx message enable calibration set to CeCANR_e_BusA_ECM TCM Rx frame calibration enabled Frame recovery stabilization delay all conditions A and (B or C) below must occur for stabilization time Bus Stabilization time A) Service mode $04 active and end of trip pocessing active A) normal serial data communication enabled A) U0073 status not B) secured controller or emission critical then use ignition voltage B) secured controller or emission critical Ignition Voltage B) Power Mode C) ignition off enable C) Power Mode C) battery voltage U0100 fault status is not Not Test Failed This Key On	Tx controller (see Table 1 in supporting document) enumeration >= 0.4 seconds >= 5 seconds = FALSE (Boolean) = TRUE (Boolean) = fault active = CeCANR_e_OBDII_Dsbl (Boolean) >= 11 volts = Run = TRUE (Boolean) =accessory >11 volts = fault active U0073	>= 10 seconds	B

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Lost Communication with GMLAN ABS Control Module	U0121	This test detects CAN (GMLAN) bus failures by detecting State of Health (SOH) failures in the following GMLAN messages $0C1, $0C5, $0D0, $1E9, and $2F9 from Antilock Brake System (ABS) Control Module.	TCM Rx message missed frame		fail times are caculated based on Rx message enable calibration set to CeCANR_e_BusA_ABS	Tx controller		C
			TCM Rx frame message missed frame	= TRUE (Boolean)	TCM Rx frame calibration enabled	(see Table 1 in supporting document) enumeration	>= 10 seconds	
					Frame recovery stabilization delay	>= 0.4 seconds		
					all conditions A and (B or C) below must occur for stabilization time			
					Bus Stabilization time	>= 5 seconds		
					A) Service mode $04 active and end of trip pocessing active	= FALSE (Boolean)		
					A) normal serial data communication enabled	= TRUE (Boolean)		
					A) P0073 status not	= fault active		
					B) secured controller or emission critical then use ignition voltage	= CeCANR_e_OBDII_Dsbl (Boolean)		
					B) secured controller or emission critical Ignition Voltage	>= 11 volts		
					B) Power Mode	= Run		
					C) ignition off enable	= TRUE (Boolean)		
					C) Power Mode	=accessory		
					C) battery voltage	> 11 volts		
					U0121 fault status is not	= fault active		
					Not Test Failed This Key On	U0073		
Lost Communication With Body Control Module	U0140	This test detects CAN (GMLAN) bus failures by detecting State of Health (SOH) failures in the following GMLAN messages $0F1, $1E1, $1F3, and $3F1 from the Truck Body Computer (TBC) Control	TCM Rx message missed frame		fail times are caculated based on Rx message enable calibration set to CeCANR_e_BusA_BCM	Tx controller		C
			TCM Rx frame message missed frame	= TRUE (Boolean)	TCM Rx frame calibration enabled	(see Table 1 in supporting document) enumeration	>= 10 seconds	
					Frame recovery stabilization delay	>= 0.4 seconds		
					all conditions A and (B or C) below must occur for stabilization time			
					Bus Stabilization time	>= 5 seconds		
					A) Service mode $04 active and end of trip pocessing active	= FALSE (Boolean)		
					A) normal serial data communication enabled	= TRUE (Boolean)		
					A) P0073 status not	= fault active		
					B) secured controller or emission critical then use ignition voltage	= CeCANR_e_OBDII_Dsbl (Boolean)		
					B) secured controller or emission critical Ignition Voltage	>= 11 volts		
					B) Power Mode	= Run		
					C) ignition off enable	= TRUE (Boolean)		
					C) Power Mode	=accessory		
					C) battery voltage	>11 volts		
					U0140 fault status is not	= fault active		
					Not Test Failed This Key On	U0073		
Brake Switch Circuit	P0571	This test counts how many vehicle acceleration events occur while the brake switch indicates "ON" or the number of vehicle deceleration events while the brake switch indicates "OFF"	Case1:		All Cases		10 Acceleration Events	C
			The number of vehicle accelerations with the brake switch "on"	>= 10	NOT Test Failed This Key On	P0571 P0716 P0717 P07BF P07C0		
			Case 2: The number of vehicle decelerations with the brake switch "off"	>= 10				
					No Fault Pending DTCs	P0721 P0722 P077C P077D		
					Not Fault Active	P0703	10 Deceleration Events	
					Components powered AND Battery Voltage	>= 9 V		
					Engine Speed between	200 RPM and 7500 RPM		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					for	5 seconds		
Brake Pedal Possition Switch Signal Rolling Count	P0703	This test detects rolling count failures for the Brake Switch GMLAN Message	The failure count increments when the GMLAN message is not received or the rolling counter does not agree with the expected value When the failure counter is for a time of Report Failure	 > 5 > 10 seconds	Components powered AND Battery Voltage between Engine Speed between for	 9 V and 18 V 200 RPM and 7500 RPM 5 seconds	15 seconds	C
Upshift Switch Circuit	P0815	This test detects the upshift switch ON	When PRNDL state is N, P or R and has been unchanged for a time AND upshift switch state is ON for a time AND When PRNDL state is a forward range and has been unchanged for a time AND upshift switch state is ON for a time	 >= 2.5 seconds >= 3 seconds. >= 2.5 seconds >= 600 seconds.	Not Test Failed This Key On Components powered AND Battery Voltage Engine Speed between for	P0826 P0708 >= 9 V 200 RPM and 7500 RPM 5 seconds	603 seconds	C
Downshift Switch Circuit	P0816	This test detects the downshift switch ON.	When PRNDL state is N, P or R and has been unchanged for a time AND downshift switch state is ON for a time. AND When PRNDL state is a forward range and has been unchanged for a time AND downshift switch state is ON for a time	 >= 2.5 seconds >= 3 seconds. >= 2.5 seconds >= 600 seconds.	Not Test Failed This Key On Components powered AND Battery Voltage Engine Speed between for	P0826 P0708 >= 9 V 200 RPM and 7500 RPM 5 seconds	603 Seconds	C
Up and Down Shift Switch Circuit	P0826	This test detects upshift/downshift switch circuit at an illegal state.	Switch state is ILLEGAL for a time	>= 10 seconds.	Not Test Failed This Key On Components powered AND Battery Voltage Engine Speed between for	P0826 >= 9 V 200 RPM and 7500 RPM 5 seconds	10 seconds	C
Controller Memory								
Control Module Read Only Memory (ROM)	P0601	This test performs a check for ECC fault at controller intiaization and a checksum test of all areas of ROM code using a CRC16 table driven method in background.	Incorrect program/calibrations checksum	= TRUE (Boolean)	Not Test Failed This Key On	P0601	= 1 Fail Counts first pass after reset (background task continuous) >= 5 Fail Counts after first pass (background task continuous)	A
			Errors in the software and calibration segments in the flash, detected by the micro's hardware based fault detection	= TRUE Boolean			>= 254 counts (Controller Initialization)	
Control Module Long Term Memory Reset	P0603	This function tests for error flags from the			Not Test Failed This Key On	P0603		A

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		NVDP and logs a code if an error was detected.	fault condition exists that affects the validity of the copy of battery independent non-volatile data kept in RAM.	= TRUE (Boolean)			every controller initialization	
			latest copy of the battery independent non-volatile data may have been lost.	= TRUE (Boolean)			>= 3 counts (controller initialization)	
					NVI_TestDiagEnbl	TRUE		
Control Module Random Access Memory (RAM)	P0604	RAM diagnostic	Test fails for any of following.		Not Test Failed This Key On	P0604		A
			secondary micro processor RAM error	= TRUE (Boolean)			1000 ms cont.	
			OR					
			dual store RAM write time out error	= TRUE (Boolean)			> 175 ms ((interrupt driven based on calling functions)	
			OR					
			errors in the system RAM segment detected by the micro's hardware based fault detection	= TRUE (Boolean)			>= 254 counts (controller initialization)	
			OR					
			parity errors in cache memory detected by the micro's hardware based fault detection	= TRUE (Boolean)			>= 3 counts (controller initialization)	
			OR					
			signature faults detected in the TPU microcode by the micro's hardware based fault detection	= TRUE (Boolean)			>= 5 counts (controller initialization)	
			OR		Service mode $04 active or end of trip processing active	FALSE		
			write attempt occurred during RAM lock	= TRUE (Boolean)			> 655534 counts (background task continuous)	
Control Module Internal Performance	P0606	Processor integrity test.			Not Test Failed This Key On	P0606		A
			main processor RAM error detection circuit hardware failure	= TRUE (Boolean)	RAM diagnotic test enable	= 1 (Boolean)	>= 5 counts (controller initialization)	
					hardware reset source is controller power up reset	= TRUE (Boolean)		
			OR					
			main processor flash EPROM error detection circuit hardware failure	= TRUE (Boolean)	flash EPROM diagnostic test enable	= 1 (Boolean)	>= 5 counts (controller initialization)	
					hardware reset source is controller power up reset	= TRUE (Boolean)		
			OR					
			main processor memory stack failure	= TRUE (Boolean)	diagnostic system enabled (diagnostic code clear not in progress AND all of the diag loops have completed their re enable paths).	= TRUE (Boolean)	>= 5 counts (100 msec continuous)	
					main processor memory stack test enable	= 1 (Boolean)		
			OR					
			secondary processor memory stack failure	= TRUE (Boolean)	Post code clear diagnostitc disabled	= FALSE (Boolean)	two consecutive counts continuously upon receival from secondary(every 12.5 ms)	
			OR					
			main processor ROM first test complete	= FALSE (Boolean)			>= 35 counts (controller power up 12.5 msec continuous)	
			OR					
			no new seed from secondary processor to main processor seed	= TRUE (Boolean)	main processor to secondary processor serial peripheral interface error (main or 2dry detected)	= FALSE (Boolean)	for more than 0.45 seconds	
					battery voltage	> 11 Volts		
					ignition voltage	>= 8 Volts		
			OR					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			seed sequence error	≠ FALSE (Boolean)	main processor to secondary processor serial peripheral interface error (main or 2dry detected)	= FALSE (Boolean)	3 counts out of 17 (on the 12.5 msec loop)	
					battery voltage	> 11 Volts		
					ignition voltage	>= 8 Volts		
			OR					
			seed key fault received from 2ndry	= TRUE (Boolean)	Post code clear diagnostic disabled	= FALSE (Boolean)	two consecutive counts (on the 12.5 ms loop)	
			OR					
			normalize 0-5 volt (absolute value (analog to digital test voltage commanded - actual analog to digital voltage feedback))	> 9 percent	diagnostic system enabled (diagnostic code clear not in progress AND all of the diag loops have completed their re-enable paths)	= TRUE (Boolean)	5 out of 10 counts OR continuous for 0.15 sec (50 ms)	
					analog to digital voltage test enabled	= TRUE (Boolean)		
					ignition voltage	>= 7 Volts		
					analog to digital voltage channel enabled	TRUE (Boolean)		
					analog to digital test voltage command	5 Volts		
			OR					
			arithmatic logic unit test pass	= FALSE (Boolean)	arithmatic logic unit test enable	= 1 (Boolean)	two consecutive counts at controller initialization, then two consecutive counts continuously every 12.5 ms	
					diagnostic system enabled (diagnostic code clear not in progress AND all the diag loops have completed their re-enable paths)	= TRUE (Boolean)		
					A and B and C must occur			
					A: starter motor engaged	= TRUE (Boolean)		
					B: ignition voltage	> 11 Volts		
					C: starter motor engaged time	> 15 sec		
			OR					
			secondary processor arithmatic logic unit fault	= TRUE (Boolean)	Post code clear diagnostitc disabled	= FALSE (Boolean)	two consecutive counts continuously upon receival from secondary(every 12.5 ms)	
			OR					
			clock test fail	= TRUE (Boolean)	clock test enable	= 1 (Boolean)	two consecutive counts at controller initialization, then two consecutive counts continuously every 12.5 ms	
					diagnostic system enabled (diagnostic code clear not in progress AND all the diag loops have completed their re-enable paths)	=TRUE (Boolean)		
					A and B and C must occur			
					A: starter motor engaged	= TRUE (Boolean)		
					B: ignition voltage	> 11 Volts		
					C: starter motor engaged time	> 15 sec		
			OR					
			configuration register test fail	= TRUE (Boolean)	configuration register test enable	= 1 (Boolean)	two consecutive counts at controller initialization, then two consecutive counts continuously every 12.5 ms	
					diagnostic system enabled (diagnostic code clear not in progress AND all the diag loops have completed their re-enable paths)	= TRUE (Boolean)		
					A and B and C must occur			
					A: starter motor engaged	= TRUE (Boolean)		
					B: ignition voltage	> 11 Volts		
					C: starter motor engaged time	> 15 sec		
			OR					
			secondary processor configuration register fault	= TRUE (Boolean)	Post code clear diagnostitc disabled	= FALSE (Boolean)	two consecutive counts continuously upon receival from secondary(every 12.5 ms)	
			OR					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			main SOH discrete fault	= TRUE (Boolean)	Post code clear diagnostitc disabled	= FALSE (Boolean)	two consecutive counts continuously upon receival from secondary(every 12.5 ms)	
			OR					
			SPI bus fault(i)	= TRUE (Boolean)	diagnostic system enabled (diagnostic code clear not in progress AND all the diag loops have completed their re-enable paths)	=TRUE (Boolean)	8 counts out of 16 (on the 6.25 msec loop)	
					A and B must occur			
					A: run/crank voltage in range	>= 11 Volts		
					OR			
					battery voltage in range	> 11 Volts		
					B: Startup/Restart time	>= 0.125 sec		
Control Module Long Term Memory Performance	P062F	Tests non volatile memory long term performance.			Not Test Failed This Key On	P062F		A
			TCM Non-Volatile Memory read or write error (every controller intialization).	= TRUE (Boolean)			every controller intialization	
			assembly calibration integrity (every controller initialization)	= TRUE (Boolean)			every controller intialization	
					NVM write error diagnotic enable	TRUE		
Control Module Serial Peripheral Interface Bus 2	P16E9	Serial peripheral hardware fault detected by secondary processor.	secondary micro processor hardware serial peripheral device fault active	= TRUE (Boolean)				A
			secondary micro processor hardware serial peripheral device fault active previous loop	= TRUE (Boolean)	Service mode $04 active and end of trip pocessing active	= FALSE(Boolean)		
Control Module Serial Peripheral Interface Bus 1	P16F0	Secondary processor message error detected by main processor.	secondary micro processor serial peripheral device message valid detected by primary micro processor since controller initialization	= FALSE (Boolean)		fail count	>= 39 counts (12.5 ms) cont	A
						out of sample count	>= 399 counts (12.5 ms) cont	
			OR secondary micro processor serial peripheral device message valid detected by primary micro processor after controller initialization	= FALSE (Boolean)		fail count	>= 39 counts (12.5 ms) cont	
						out of sample count	>= 399 counts (12.5 ms) cont	
			OR secondary micro processor serial peripheral device message valid detected by primary micro processor after controller initialization	= FALSE(Boolean)		fail count	>= 159 counts (12.5 ms) NON continuous	
						out of sample count	>= 399 counts (12.5 ms) NON continuous	
					NOT in low voltage engine crank condition defined by A or B below during, for low voltage mode time			
					low voltage mode time >= 0.025 seconds			
					A) low voltage mode hysteresis time <= 0.1 seconds			
					B) ignition voltage, set low voltage mode <= 6.4092 volts			

19 OBDG04B TCM T87A 6 Speed Summary Tables
Diagnostic Supporting Tables

Table 1

KaCANG_RxDeviceIndx	**Axis**	CeCANG_e_RcvMsg_0BE_BusA	CeCANG_e_RcvMsg_0C1_BusA	CeCANG_e_RcvMsg_0C5_BusA	CeCANG_e_RcvMsg_0C9_BusA	frame
KaCANG_RxDeviceIndx	**Curve**	CeCANR_e_BusA_ECM	CeCANR_e_BusA_ABS	CeCANR_e_BusA_ABS	CeCANR_e_BusA_ECM	enable or invalid
	Axis	CeCANG_e_RcvMsg_0D0_BusA	CeCANG_e_RcvMsg_0F1_BusA	CeCANG_e_RcvMsg_191_BusA	CeCANG_e_RcvMsg_1A1_BusA	frame
	Curve	CeCANR_e_BusA_ABS	CeCANR_e_BusA_BCM	CeCANR_e_BusA_ECM	CeCANR_e_BusA_ECM	enable or invalid
	Axis	CeCANG_e_RcvMsg_1CF_BusA	CeCANG_e_RcvMsg_1E1_BusA	CeCANG_e_RcvMsg_1E9_BusA	CeCANG_e_RcvMsg_1F3_BusA	frame
	Curve	CeCANR_e_InvalidRxDevice	CeCANR_e_BusA_BCM	CeCANR_e_BusA_ABS	CeCANR_e_BusA_BCM	enable or invalid
	Axis	CeCANG_e_RcvMsg_1F9_BusA	CeCANG_e_RcvMsg_1FC_BusA	CeCANG_e_RcvMsg_287_BusA	CeCANG_e_RcvMsg_2C3_BusA	frame
	Curve	CeCANR_e_BusA_PTO	CeCANR_e_InvalidRxDevice	CeCANR_e_BusA_ECM	CeCANR_e_BusA_ECM	enable or invalid
	Axis	CeCANG_e_RcvMsg_2D1_BusA	CeCANG_e_RcvMsg_2F9_BusA	CeCANG_e_RcvMsg_3B9_BusA	CeCANG_e_RcvMsg_3D1_BusA	frame
	Curve	CeCANR_e_InvalidRxDevice	CeCANR_e_BusA_ABS	CeCANR_e_BusA_ECM	CeCANR_e_BusA_ECM	enable or invalid
	Axis	CeCANG_e_RcvMsg_3E9_BusA	CeCANG_e_RcvMsg_3F1_BusA	CeCANG_e_RcvMsg_3F9_BusA	CeCANG_e_RcvMsg_4C1_BusA	frame
	Curve	CeCANR_e_BusA_ECM	CeCANR_e_BusA_BCM	CeCANR_e_BusA_ECM	CeCANR_e_BusA_ECM	enable or invalid
	Axis	CeCANG_e_RcvMsg_4F1_BusA	frame			
	Curve	CeCANR_e_BusA_ECM	enable or invalid			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Performance	P064C	Electronic circuitry determines fault with GP switch	Glow Plug Current and Glow plug is commanded and voltage at glow plug	< = =	3.2 On 0	amps volts	glow plugs are commanded on DTCs P163C, P0671-P0678	=	True Not set		fail conditions exists for 3.5 seconds. monitor runs with 0.5 s rate whenever enable conditions are met.	Type B, 2 Trips
		Checksum error between calculated and stored values are compared	ROM error: Checksums match	=	NO		Module power		On		fail conditions exists for 4.5 s. monitor runs with 1.5 s rate whenever enable conditions are met.	
		Compariarson of read write values	RAM error: Read write values match	=	NO		Module power		On		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	
		Checksum error between calculated and stored values	EEPROM error: Checksums match	=	NO		Module power		On		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	
		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Under voltage	<=	Battery voltage at GPCM + 7	volts	Battery voltage at GPCM	>	6	volts	fail conditions exists for 3.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	
		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Over voltage	>=	Battery voltage at GPCM + 18	volts					fail conditions exists for 3.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Elecrtonic circuitry determines that the reverse polarity protection voltage drop is in range	GPCM reverse polarity switch "high voltage drop" Path 1 [Battery voltage at GPCM - mean glow plug voltage value] Path 2 (Battery voltage at GPCM - mean glow plug voltage value with charge pump off) - (Battery - mean glow plug voltage value with charge pump on	> <	2.3 0.300	volts volts	glow plugs are commanded Battery voltage at GPCM GP current GP current P0671,P0672, P0675, P0676 Battery voltage at GPCM stable for 30ms	= > > < = <	On 5 3.2 60 Not set 2	 volts amps amps volts	Path1: fail conditions exists for 9 seconds. monitor runs with 6 s rate whenever enable conditions are met. Path2: fail conditions exists for 13 seconds. monitor runs with 10 s rate whenever enable conditions are met.	
		Internal and external Watchdogs are monitored for interuption Monitor for undefined instruction code interupt Monitor for osolation stop detection	GPCM running reset: number of running resets or undefined instruction code detected or Osolation stop detection	>	9 events in a row		none				fail conditions exists for 5 seconds. monitor runs with 2 s rate whenever enable conditions are met.	
		measure temperature of the SBC	system basic chip (SBC) over temperature: temperature of the high side switch inside the SBC	>	155	deg C	Internal GPCM temperature	<	100	deg C	fail conditions exists for 3.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	
Glow Plug 1 through 8 Circuit Fault	P0671-P0678	glow plug open: electronic circuitry determines a fault exists on GP circuit	Glow Plug Current and voltage at glow plug pin	< >	4.00 and 6.0	amps volt	Ignition - glow plugs are commanded on P163D,P163C Supply voltage	= > >	On 5 not set 8.5	 secs volts	fail conditions exists for 1.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	Type B, 2 Trips
		glow plug high resistance: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance AND Glow Plug Current	> >=	1.83 4.00	ohm amps	Ignition on Battery voltage at GPCM glow plugs are commanded on over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= > = = = <	on 7.0 on false false 7.0	 volts volts	fail conditions exists for 1.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug 1 through 8 Circuit Fault	P066A-P068E	glow plug short: electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Current Path 2: Hardware over current	> >	60 100	amps amps	Ignition glow plug command over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= = = = <	on on false false 6.0	volts	Path1: fail conditions exists for 1.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met. Path2: fail conditions exists for 1.26 seconds. monitor runs with 0.26 s rate whenever enable conditions are met.	Type B, 2 Trips
		Glow plug low resistance: electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Resistance Path 2: Glow Plug Resistance	< <	250 500	mOhm mOhm	glow plugs are commanded on over temperature condition over voltage condition- abs[Battery supply at GPCM - IGN voltage at GPCM] glow plugs "on" duration glow plugs are commanded on over temperature condition over voltage condition- abs[Battery supply at GPCM - IGN voltage at GPCM] glow plugs "on" duration	= = = > > = = = > >	on false false 7.0 glow plugs "on" for more than 600 ms on false false 7.0 glow plugs "on" for more than 10 sec	volts volts	fail conditions exists for 1.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	
Lost Communication With Glow Plug Control Module	U0106	GMLAN Communication ECM -> GPCM: ECM monitors serial data from GPCM for U0106. Error Message indicating GPCM is not receiving major GMLAN signals.	Timeout of message $C9 or Timeout of message $4C1 or Timeout of message $4F1	> > >	0.100 2 3	sec sec sec	Ignition 1 battery voltage at GPCM	> >	3.9 7.0	volts	fail conditions exists for 11 seconds. monitor runs with 10 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Not Programed	P161A	ECM monitors serial data from GPCM for P161A. GPCM is configured as service part by calibration parameter	Glow Plug Control Module determines settings of configuration parameter located in calibration data set				Ignition	=	ON		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	Type A, 1 Trip

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Module Primary Circuit	P163C	Electronic GPCM circuitry determines the voltage supply to GPCM is out of range	PATH 1: voltage supply to GPCM	<	6.0	volt	GPCM Ignition voltage	>	9.0	volt	fail conditions exists for 4 seconds. monitor runs with 1 s rate whenever enable conditions are met.	Type B, 2 Trips
			or				or					
			PATH 2: (voltage supply to GPCM- IGN)	>	+/-5	volt	GPCM voltage supply	>	6.0	volt		
							GPCM Ignition voltage	>	4.0	volt		
			or				or					
							GPCM supply voltage	>	6	volt		
			PATH 3: (voltage supply to GPCM -ECM reported voltage via CAN)	>	+/-3	volt	Engine speed	>	10< rpm >400	rpm		
Glow Plug Module Secondary Circuit	P163D	Electronic GPCM circuitry determines serveral signal voltage levels to GPCM are out of range	Path 1: Key state (Ign 1)	=	OFF		Path 1 glow plug activation request from ECM	=	ON		fail conditions exists for 4 seconds. monitor runs with 1 s rate whenever enable conditions are met.	Type B, 2 Trips
			or				or		or			
			Path 2: Electronic circuitry determines voltage at glow plug pin	>	6.0	volt	Path 2 GP commanded	=	Off			
			or				or		or			
			Path 3: [GPCM ground - GP ground]	>	+/-1.5	volts	Path 3 GP commanded	=	ON			
							DTCs not set		P0671,P0675			
Glow Plug Control Module Temperature Sensor (μC) Circuit Low voltage	P16AD	ECM monitors serial data from GPCM for P16AD Error Message indicating GPCM detects GPCM temperature sensor (μC) voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	0.078	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (HSS14) Circuit Low voltage	P101B	ECM monitors serial data from GPCM for P101B Error Message indicating GPCM detects GPCM temperature sensor (HSS14) voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	0.078	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Temperature Sensor (HSS58) Circuit Low voltage	P101D	ECM monitors serial data from GPCM for P16AD Error Message indicating GPCM detects GPCM temperature sensor (HSS58) voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	0.078	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (µC) Circuit High voltage	P16AE	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensor (µC) voltage our of range high	GPCM temperature sensor voltage	>	4.916	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (HSS14) Circuit High voltage	P101C	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensor (HSS58) voltage our of range high	GPCM temperature sensor voltage	>	4.916	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature Sensor (HSS58) Circuit High voltage	P101E	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensor (HSS58) voltage our of range high	GPCM temperature sensor voltage	>	4.916	volts					fail conditions exists for 1.80 seconds. monitor runs with 1.30 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow Plug Control Module Temperature at µC not plausible	P101F	ECM monitors serial data from GPCM for P101F Error Message indicating GPCM detects GPCM temperature sensor (µC) plausibility	PATH 1: Temp µC – Temp HSS14 and Temp µC – Temp HSS58 and Temp HSS58 – Temp HSS14	> > <=	12 12 12	Kelvin Kelvin Kelvin	Glow plugs Off Reset protection flag P16AE, P101C, P101E P16AD, P101B, P101D	> = = =	30 False Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			PATH 2: Temp µC – Temp HSSnn	>	12	Kelvin	Glow plugs Off Reset protection flag and P16AE, P101C P16AD, P101B or P16AE, P101E P16AD, P101D	> = = = = =	30 False Not Set Not Set Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
Glow Plug Control Module Temperature at HSS14 not plausible	P102D	ECM monitors serial data from GPCM for P102D Error Message indicating GPCM detects GPCM temperature sensor (HSS14) plausibility	PATH 1: Temp HSS14 – Temp HSS58	>	15	Kelvin	Glow plugs commanded on P101C, P101E P101B, P101D	= = =	On Not Set Not Set		fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips
			PATH 2: Temp HSS14 – T_HSS58 and Temp HSS14 – Temp µC and Temp HSS58 – Temp µC	> > <=	12 12 12	Kelvin Kelvin Kelvin	Glow plugs Off Reset protection flag and P16AE, P101C, P101E P16AD, P101B, P101D	> = = =	30 False Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
			PATH 3:Temp HSS14 – Temp T nn	>	12	Kelvin	Glow plugs Off Reset protection flag and P101C, P16AE P101B, P16AD or P101C, P101E P101B, P101D	> = = = = =	30 False Not Set Not Set Not Set Not Set	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Temperature at HSS58 not plausible	P102E	ECM monitors serial data from GPCM for P102E Error Message indicating GPCM detects GPCM temperature sensor (HSS58) plausibility	PATH 1: Temp HSS58 – Temp HSS14	>	15	Kelvin	Glow plugs commanded on	=	On		fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips
							P101C, P101E	=	Not Set			
							P101B, P101D	=	Not Set			
			PATH 2: Temp HSS58 – T_HSS14	>	12	Kelvin	Glow plugs Off	>	30	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
							Reset protection flag	=	False			
			and									
							and					
			Temp HSS58 – Temp µC	>	12	Kelvin						
							P16AE, P101C, P101E	=	Not Set			
			and				P16AD, P101B, P101D	=	Not Set			
			Temp HSS58 – Temp HSS14	<=	12	Kelvin						
			PATH 3:Temp HSS58 – Temp T nn	>	12	Kelvin	Glow plugs Off	>	30	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	
							Reset protection flag	=	False			
							and					
							P101C, P16AE	=	Not Set			
							P101B, P16AD	=	Not Set			
							or					
							P101C, P101E	=	Not Set			
							P101B, P101D	=	Not Set			
Glow Plug Control Module Temperature system not plausible	P102F	ECM monitors serial data from GPCM for P102F Error Message indicating GPCM detects GPCM temperature system plausibility	Temp µC – Temp HSS14	>	12	Kelvin	Glow plugs Off	>	30	sec	fail conditions exist for 2.14 seconds. Monitor runs with 1.64 s rate whenever conditions are met.	Type B, 2 Trips
							Reset protection flag	=	False			
			and				P16AE, P101C, P101E	=	Not Set			
							P16AD, P101B, P101D	=	Not Set			
			Temp µC – Temp HSS58	>	12	Kelvin						
			and									
			Temp HSS58 – Temp HSS14	>	12	Kelvin						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug 1 through 8 diagnostic when glow plugs are performing a heat up procedure (ramp up) after GPCM is powered up	P06C5-P06CC	glow plug low resistance at power up: electronic circuitry determines a fault exists on GP circuit at power up	Glow Plug Resistance	<	0.160 + .003 * N_PWM Cycles	ohm	Ignition	=	on		fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 0.850 sec. after power up. Monitor runs with 0,06 s rate whenever conditions are met during ramp up.	Type B, 2 Trips
			and				Battery voltage at GPCM	>	7.0	volts		
			Glow Plug Current	>=	4.00	amps	over temperature condition	=	false			
			and				over voltage condition	=	false			
			No.of consecutive low resistance measurements	>	5		abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
		glow plug high resistance at power up: electronic circuitry determines a fault exists on GP circuit at power up	Glow Plug Resistance	>	0.550 + .050 * N_PWM Cycles	ohm	Ignition	=	on		fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 0.850 sec after power up. Monitor runs with 0,06 s rate whenever conditions are met during ramp up.	
			and				Battery voltage at GPCM	>	7.0	volts		
			Glow Plug Current	>=	4.00	amps	over temperature condition	=	false			
			and				over voltage condition	=	false			
			No.of consecutive low resistance measurements	>	5		abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
							P066A-P068F	=	Not Set			
		glow plug low resistance gradient: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance Gradient	<	0.070/0.62	ohm / sec	Ignition	=	on		fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 2.55 seconds after power up. Glow plug resitance measurement runs continiuously whenever conditions are met during ramp up.	
			and				Battery voltage at GPCM	>	7.0	volts		
			Glow Plug Current	>=	4.00	amps	over temperature condition	=	false			
							over voltage condition	=	false			
							abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
							P066A-P068F	=	Not Set			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		glow plug resistance gradient low range: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance Gradient	<	0.088/0.524	ohm/ sec	Ignition	=	on		fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 0.850 sec after power up. Glow plug resitance measurement runs continiuously whenever conditions are met during ramp up.	
							Battery voltage at GPCM	>	7.0	volts		
			and				over temperature condition	=	false			
							over voltage condition	=	false			
			Glow Plug Current	>=	4.00	amps	abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
							P066A-P068F	=	Not Set			
		glow plug resistance gradient range high: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance Gradient	>	0.800/0.524	ohm/ sec	Ignition	=	on		fail conditions exist for 1.0 seconds after end of ramp up. Ramp up ends latest after 0.850 sec after power up. Glow plug resitance measurement runs continiuously whenever conditions are met during ramp up.	
							Battery voltage at GPCM	>	7.0	volts		
			and				over temperature condition	=	false			
							over voltage condition	=	false			
			Glow Plug Current	>=	4.00	amps	abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
							P066A-P068F	=	Not Set			
Glow Plug 1 through 8 Hot resistance fault	P1338-P133F	glow plug hot resistance low: electronic circuitry determines a fault exists on GP circuit	Glow Plug Hot Resistance	<	0.600	ohm	Afterrun Characterization	=	True		Diagnostic performed after characterization: failure status stored in EEPROM, will be reported after 1.0 sec. after start up.	Type B, 2 Trips
							Battery voltage at GPCM	>	7.0	volts		
			and				over temperature condition	=	false			
							over voltage condition	=	false			
			Glow Plug Current	>=	4.00	amps	abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
							P06Cx	=	Not Set	sec		
		glow plug hot resistance: electronic circuitry determines a fault exists on GP circuit	Glow Plug Hot Resistance	>	1.800	ohm	Afterrun Characterization	=	True		Diagnostic performed after characterization: failure status stored in EEPROM, will be reported after 1.0 sec. after start up.	
							Battery voltage at GPCM	>	7.0	volts		
			and				over temperature condition	=	false			
							over voltage condition	=	false			
			Glow Plug Current	>=	4.00	amps	abs[Battery supply at GPCM - IGN voltage at GPCM]	<	7.0	volts		
							Reset protection flag	=	false			
							P06Cx	=	Not Set	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow plug control module over temperature	P263E	Glow plug control module over temperature	GPCM temperature - glow plug resistance gradients - glow plug Rhot resistance - failure status of Rhot resistance +E136	>	123	deg C	Glow plugs are commanded on coolant temp coolant temp	= < =	On 60 Valid	 deg C	As long as fail conditions exist. Monitor runs with 6.50 s rate whenever enable conditions are met.	Type B, 2 Trips
Glow plug control module unable to complete GP ini	P1337	GP unable to complete characterization	PATH 1: Checksum error EEPROM: Resistance gradients or PATH 2: Checksum error EEPROM: hot resistance or PATH 3: Faulty status in hot resistance	= = =	YES YES YES		MEC	=	0		Perfomed only at power up. Will be reported after 1.0 sec. whenever enabled conditions are met.	Type A, 1 Trips