Section 1 : S1-12OBDG09

Contains information that is common to all applications within 12OBDG09

GMT911 - Chevrolet Silverado HD
GMT610 - Chevrolet Express
GMT912 - GMC Sierra HD

Section 2 : S2-12OBDG09_Glow Plug Module

Contains diagnostic information that is performed within the Glow Plug Control Module and common to all applications within 12OBDG09

The diagnostic algorithms are contained within the Glow Plug Control Module, but the Fault Code storage handling and MIL Illumination are performed within the ECM

Section 3 : S3-12OBDG09-LGH_Specific

Contains information that is specific to the LGH applications within 12OBDG09

GMT911 - Chevrolet Silverado HD
GMT610 - Chevrolet Express
GMT912 - GMC Sierra HD

Parameter Definition

Contains definitions of secondary parameters which are used in the parameter document.

These secondary parameters conditions are shown in the respective physical parameters which define each condition.

Calibration Look-Up Tables

Contains the calibration look-up tables from both the Section 1, Section 3, and the Parameter Definitions

Inhibit Tables

Contains the matrix of diagnostics which are inhibited from being executed if an active DTC is stored in the ECM

Enable Tables

Contains the matrix of additional enable conditions which need to be satisfied for each diagnotic to be enabled

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Crankshaft to Camshaft Correlation	P0016	Detects a shift of the camshaft angle by monitoring the average offset angle.	average value of camshaft offset	<	-20.00	degrees	ignition on	=	TRUE	-	fail conditions exists for more than 4 events test performed continuously 0.01 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost Control Position Not Learned	P003A	Detects in range vane position errors during a vane sweep initiated to learn minimum and maximum vane position values.	**Path 1:**				(				fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	B
			mean offset learned value at fully open valve position	<	5.54	%	turbocharger offset adaptation timer	>=	0.15	sec		
			or				)					
			mean offset learned value at fully open valve position	>	36.94	%	and					
			or				offset learning for turbo charger (VNT) actuator position sensor is active during idling	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Path 2:		- in order to compensate sensor drift and valve aging the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve			
			time taken to learn the mean offset learned value at fully open valve position	> 30 sec	and			
			or		engine idle	= TRUE -		
			time taken to learn the mean offset learned value at fully closed valve position	> 30 sec	means			
			or		(			
			Path 3:		Engine Running (see parameter definition)	= TRUE -		
			mean offset learned value at fully closed valve position	< 68.01 %	and			
			or		time since start	< 21474836 sec		
			mean offset learned value at fully closed valve position	> 95.61 %	)			
					and			
					diagnostic performed in current dc	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Control Circuit	P0045	Electronic output driver circuitry determines circuit integrity on the turbo boost solenoid control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	> 11 V		
					for			
					time	> 3 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost Control Circuit Low Voltage	P0047	Electronic out-put driver circuitry determines circuit integrity on the turbo boost solenoid control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Turbocharger Boost Control Circuit High Voltage	P0048	Electronic out-put driver circuitry determines circuit integrity on the turbo boost solenoid control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost High Control Circuit Low Voltage	P006E	Electronic output driver circuitry determines circuit integrity on the turbo boost solenoid control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition on	=	TRUE	-	fail conditions exists for 1.5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost High Control Circuit High Voltage	P006F	Electronic output driver circuitry determines circuit integrity on the turbo boost solenoid control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					
					(					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3	sec		
							)					
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
CAC Temperature Sensor Circuit High Voltage	P007C	Detects a CAC temperature sensor circuit short to ground.	CAC downstream temperature sensor voltage	<	0.1058	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	A
			same as				and					
			downstream CAC temperature	>	150	°C	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
CAC Temperature Sensor Circuit Low Voltage	P007D	Detects a CAC temperature sensor circuit short to high voltage or a sensor open circuit	CAC downstream temperature sensor voltage	>	4.9306	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	A
			same as				and					
			downstream CAC temperature	<	-53	°C	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Rail Pressure [FRP] Too Low	P0087	Measured rail pressure is checked against desired rail pressure to detect low rail pressure conditions.	rail pressure deviation from setpoint calculated out of difference between desired and actual value (see Look-Up-Table #58)	>	11000 to 80000	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							metering unit actuator test active	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			rail pressure deviation from setpoint calculated out of difference between desired and actual value (see Look-Up-Table #61)	> 11000 to 80000 kPa	(		fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	
					state machine rail pressure control equal to pressure control valve	= TRUE -		
					or			
					state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	= TRUE -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					metering unit actuator test active	= FALSE -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Rail Pressure [FRP] Too High	P0088	Measured rail pressure is checked against desired rail pressure to detect high rail pressure conditions.	rail pressure deviation from setpoint calculated out of difference between desired and actual value (see Look-Up-Table #59)	<	-80000 to -20000	kPa	Path 1:				fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							current injection quantity	>	8	mm^3 /rev		
							and					
							state machine rail pressure control equal to metering unit control mode	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							metering unit actuator test active	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	-20000	kPa	(				fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	
							state machine rail pressure control equal to pressure control valve	=	TRUE	-		
							or					

<table>
<tr><th>Component / System</th><th>Fault Code</th><th>Monitor Strategy Description</th><th>Primary Malfunction Criteria</th><th>Threshold Logic and Value</th><th>Secondary Parameters</th><th>Enable Conditions</th><th>Time Required</th><th>MIL Illum.</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)</td><td>= TRUE -</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>)</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>and</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>basic enable conditions met:</td><td>= see sheet enable tables -</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>and</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>NO Pending or Confirmed DTCs:</td><td>= see sheet inhibit tables -</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible</td><td>P008F</td><td>Detects a biased ECT or fuel temperature by comparing start-up temperatures between the two sensors.</td><td>Path 1:</td><td></td><td>minimum engine-off time</td><td>>= 28800 sec</td><td>fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met</td><td>B</td></tr>
<tr><td></td><td></td><td></td><td>|(a) - (b)| (see Look-Up-Table #16) where</td><td>> 100 to 999 °C</td><td>and</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(</td><td></td><td>ambient temperature</td><td>> -60.04 °C</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(a) captured engine coolant temperature at start</td><td>= measured parameter -</td><td>and</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>and with</td><td></td><td>engine speed (see Look-Up-Table #87)</td><td>> 600 to 850 rpm</td><td></td><td></td></tr>
</table>

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(b) captured fuel temperature at start	= measured parameter -	for			
			)		time	> 0 sec		
					and			
			or		engine post drive/ afterun	= FALSE -		
			Path 2:		and			
			|(a) - (b)| (see Look-Up-Table #16)	<= 100 to 999 °C	diagnostic performed in current dc	= FALSE -		
			with		and			
			(a) captured engine coolant temperature at start	= measured parameter -	basic enable conditions met:	= see sheet enable tables -		
			and		and			
			(b) captured fuel temperature at start	= measured parameter -	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			and					
			|(a) - (b)| (see Look-Up-Table #17)	> 20 to 999 °C				
			where					
			(a) captured engine coolant temperature at start	= measured parameter -				
			and					
			(b) captured fuel temperature at start	= measured parameter -				
			and					
			(					
			status of block heater (see parameter definition)	= FALSE -				

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Pressure Regulator 1 Control Circuit/Open	P0090	Electronic out-put driver circuitry determines circuit integrity on the Fuel Pressure Regulator Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 Control Circuit Low	P0091	Detects low voltage readings on the fuel pressure regulator 1 control circuit, indicating low voltage condition on the fuel pressure regulator control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11	V	fail conditions exists for 0.75 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 Control Circuit High	P0092	Detects high voltage readings on the fuel pressure regulator 1 control circuit, indicating high voltage condition on the fuel pressure regulator 1 control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11 V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Intake Air Temperature Sensor 2 Circuit Low Voltage	P0097	Detects low voltage readings on the intake air temperature sensor 2 circuit, indicating an OOR low condition.	intake air temperature sensor 2 voltage	< 0.0326 V	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
			same as		and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			temperature of intake air temperature sensor 2	> 250 deg	basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Intake Air Temperature Sensor 2 Circuit High Voltage	P0098	Detects high voltage readings on the intake air temperature sensor 2 circuit, indicating an OOR high condition.	intake air temperature sensor 2 voltage	> 4.9306 V	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
			same as		and			
			temperature of intake air temperature sensor 2	< -53 °C	basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Fuel Pressure Regulator 1 High Control Circuit Low Voltage	P00C9	Detects low voltage readings on the fuel pressure regulator 1 control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 0.5s monitor runs with 0.01 s rate whenever enable conditions are met	A
					battery voltage	> 11 V		
					for			
					time	3 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					for					
					time		3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Fuel Rail Pressure Regulator 1 High Control Circuit High Voltage	P00CA	Detects high voltage readings on the fuel rail pressure regulator 1 circuit, indicating high condition on the fuel pressure actuator circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	A
					battery voltage	>	11	V		
					for					
					time		3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					for					
					time		3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Mass Air Flow (MAF) Sensor Performance	P0101	Detects skewed MAF sensor by comparing measured MAF to calculated expected MAF based on volumetric efficiency of the engine	(		ambient pressure	> 74.8 kPa	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			measured air mass flow signal with	< (a) - (b) -	and			
					(			
			(a) engine load dependent MAP for calculating lower threshold (see Look-Up-Table #2)	= 0.75 to 0.8 -	engine coolant temperature	>= -20.04 °C		
			and with		and			
			(b) air temperature dependent correction factor curve (see Look-Up-Table #1)	= 0 to 0.05 -	engine coolant temperature	<= 122.96 °C		
			or		)			
			measured air mass flow signal with	> (c) + (b) -	and			
					(			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(c) Engine load dependent MAP for calculating higher threshold and with	=	1.2	-	gradient of the charge-air temperature	>=	-2	°C/s		
							and					
			(b) air temperature dependent correction factor curve (see Look-Up-Table #1)	=	0 to 0.05	-	gradient of the charge-air temperature	<=	2	°C/s		
			)				)					
							and					
							(					
							engine speed (see Look-Up-Table #87)	>	600 to 850	rpm		
							for					
							time since start	>	90	sec		
							)					
							and					
							control value of the throttle valve	>=	-400	%		
							and					
							control value of the throttle valve	<=	5.00	%		
							and					
							(					
							(					
							setpoint valve position of exhaust-gas recirculation	>=	-400	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<=	2.00	%		
							)					
							for					
							time	>	3	sec		
							and					
							injection quantity	<=	300	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							air pressure in the induction volume	<=	280	kPa		
							)					
							and					
							(					
							engine speed	>=	625	rpm		
							and					
							engine speed	<=	1500	rpm		
							)					
							and					
							(					
							intake air temperature	>=	-7.04	°C		
							and					
							intake air temperature	<=	51.96	°C		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Mass Air Flow (MAF) Sensor Circuit High Voltage	P0102	Detects low frequency readings on the MAF circuit, indicating an OOR high condition on the MAF circuit	signal period of air mass flow sensor (MAF)	>	881	us	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	A
			same as				and					
			air mass flow	<	1.08	g/s	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Mass Air Flow (MAF) Sensor Circuit Low Voltage	P0103	Detects low frequency readings on the MAF circuit, indicating an OOR low condition on the MAF circuit	PWM period too long	= TRUE	ignition on	= TRUE -	fail conditions exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	A
			or		and			
			signal period of air mass flow sensor (MAF)	< 50 us	basic enable conditions met:	= see sheet enable tables -		
			same as		and			
			air mass flow	> 560.83 g/s	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Manifold Absolute Pressure (MAP) Sensor Performance	P0106	Detects a skewed MAP or BARO sensor by comparing MAP readings to the BARO sensor	**Path 1:**		measured coolant engine downstream temperature	> -3549.94 °C	fail conditions exists for 5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			(a) - (b)	< -15.0 kPa	and			
					current injection quantity	< 1308 mm^3 /rev		
			or		and			
			Path 2:		actuator position of throttle valve	<= 327.67 %		
			(a) - (b)	> 15.0 kPa	and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			where		turbo charger (VNT) wiping is active	= FALSE -		
			(a) MAP sensor measured pressure	= measured parameter -	and			
			and		(			
			(b) BARO sensor measured pressure	= measured parameter -	engine speed	>= 0 rpm		
					and			
					engine speed	<= 100 rpm		
					)			
					and			
					vehicle speed	< 3.11 mph		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	P0107	Detects low voltage readings on the MAP circuit, indicating an OOR low condition on the MAP circuit	**Path 1:**		engine synchronization completed	= TRUE -	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			(		and			
			sensor voltage of manifold absolute pressure	< 0.9106 V	basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			same as									
			manifold absolute pressure	<	44.9	kPa						
			and									
			actuator position of throttle valve	<=	20	%						
			)									
			or									
			Path 2:									
			(									
			sensor voltage of manifold absolute pressure	<	0.3794	V						
			same as									
			manifold absolute pressure	<	-0.3	kPa						
			and									
			actuator position of throttle valve	>	20	%						
			)									
Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	P0108	Detects high voltage readings on the MAP circuit, indicating an OOR high condition on the MAP circuit	sensor voltage of manifold absolute pressure	>	4.75	V	engine synchronization completed	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			same as				and					
			manifold absolute pressure	>	371.3	kPa	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Intake Air Temperature (IAT) Sensor Circuit High Voltage	P0113	Detects high voltage readings on the IAT circuit, indicating an OOR high condition on the IAT circuit	intake air temperature sensor voltage	>	4.9286	V	ignition	=	on	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
			same as				and					
			intake air temperature	<	-52	°C	basic enable conditions met:	=	see sheet enable tables	-		
Intake Air Temperature (IAT) Sensor Circuit Low Voltage	P0112	Detects low voltage readings on the IAT circuit, indicating an OOR low condition on the IAT circuit	intake air temperature sensor voltage	<	0.0794	V	ignition	=	on	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
			same as				and					
			intake air temperature	>	150	°C	basic enable conditions met:	=	see sheet enable tables	-		
Engine Coolant Temperature (ECT) Sensor Circuit High Voltage	P0118	Detects high voltage readings on the ECT circuit, indicating an OOR high condition on the ECT circuit	voltage of engine coolant temperature sensor	>	4.8962	V	ignition	=	on	-	fail conditions exists for 60 s test performed continuously 0.2 s rate	A
			same as				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			engine coolant temperature	< -53 deg C	basic enable conditions met:	= see sheet enable tables -		
Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage	P0117	Detects low voltage readings on the ECT circuit, indicating an OOR low condition on the ECT circuit	voltage of engine coolant temperature sensor	< 0.509 V	ignition	= on -	fail conditions exists for 15 s test performed continuously 0.2 s rate	A
			same as		and			
			engine coolant temperature	> 70 deg C	basic enable conditions met:	= see sheet enable tables -		
Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	P0128	Detects a stuck open thermostat by comparing actual engine coolant heat up profile to an expected modeled heat up profile. The targets are dependent on start up conditions (high and low regions)	modeled coolant temperature (model derived from injection quantity, coolant temperature at start, and ambient temperature)	> 59.96 °C	engine pre drive	= FALSE -	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	B
			and		and			
			measured engine coolant temperature	< 49.96 °C	time since start	< 1440 sec		
					and			
					measured engine coolant temperature	> -40.04 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Low Region Engine Temperature at start < 31 °C AND ambient air temperature <= 10 °C.			and					
					captured value of coolant temperature during start	<	30.96	°C		
					and					
					(					
					ambient temperature	>	-7.04	°C		
					and					
					ambient temperature	<	59.96	°C		
					)					
					and					
					ambient temperature (used for low region determination)	<	9.96	°C		
					and					
					engine idle time ratio	<	0.50	%		
					which is defined by the following conditions:					
					(					
					accelerator pedal value	<=	10.01	%		
					and					
					vehicle speed	<=	9.94	mph		
					and					
					engine speed	<=	750	rpm		
					)					
					and					
					diagnostic performed in current dc	=	FALSE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
		Detects a stuck open thermostat by comparing actual engine coolant heat up profile to an expected modeled heat up profile. The targets are dependant on start up conditions (high and low regions)	modeled coolant temperature (model derived from injection quantity, coolant temperature at start, and ambient temperature)	> 81.96 °C	engine pre drive	= FALSE -	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	
			and		and			
			measured engine coolant temperature	< 70.96 °C	time since start	< 1440 sec		
					and			
					measured engine coolant temperature	> -40.04 °C		
					and			
		High region Engine Temperature at start < 52 °C AND ambient air temperature > 10 °C						
					captured value of coolant temperature during start	< 51.96 °C		
					and			
					(			
					ambient temperature	> -7.04 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					ambient temperature	<	59.96	°C		
					)					
					and					
					ambient temperature (used for high region determination)	>	9.96	°C		
					and					
					engine idle time ratio	<	0.50	%		
					which is defined by the following conditions:					
					(					
					accelerator pedal value	<=	10.01	%		
					and					
					vehicle speed	<=	9.94	mph		
					and					
					engine speed	<=	750	rpm		
					)					
					and					
					diagnostic performed in current dc	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
HO2S Bank1 Sensor2 Circuit High	P0138	Detects an out of range high fault of the downstream Nox sensor lambda signal	Downstream Nox sensor lambda signal low received via CAN	>	1550	counts	Valid downstream NOx signal from CAN is received (no Nox sensor communication failures)	=	TRUE	-	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	B
					(1550 counts = 0.65 Lambda = -0.1178 %O2)		Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response) and	>	20	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Bank1 Sensor2 Circuit Low	P0137	Detects an out of range low fault of the downstream Nox sensor lambda signal	Downstream Nox sensor lambda signal high received via CAN	<	-150	counts	Valid downstream NOx signal from CAN is received (no Nox sensor communication failures)	=	TRUE	-	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	B
					(-150 counts = 1100 Lambda = ~27 %O2)		Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response) and	>	20	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 1 Circuit High	P0183	Detects high voltage readings in the fuel pump temperature sensor 1 circuit, indicating an OOR high condition on the fuel pump temperature sensor 1 circuit	voltage of fuel temperature sensor 1	>	4.7132	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	<	- 50	degC	basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 1 Circuit Low	P0182	Detects low voltage readings in the fuel pump temperature sensor 1 circuit, indicating an OOR low condition on the fuel pump temperature sensor 1 circuit	voltage of fuel temperature sensor 1	<	0.599	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			or same as				and					
			fuel temperature	>	60	deg C	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Rail Pressure [FRP] Sensor Performance	P0191	Detects a drifted fuel rail pressure sensor by determining the adaptation factor of the fuel rail pressure regulator 2.	fuel pressure regulator 2 adaptation factor	>=	1.25	factor	fuel pressure regulator 2 in closed loop control	=	TRUE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			or				and					
			fuel pressure regulator 2 adaptation factor	<=	0.75	factor	adaptation for fuel pressure regulator 2 active means	=	TRUE	-		
							(					
							counter for successful adaptation	>	0	counts		
							or					
							counter for the successful calculation of the adaptation	>	9	counts		
							and					
							(					
							engine speed	>	400	rpm		
							and					
							engine speed	<	1000	rpm		
							)					
							and					
							vehicle speed	<=	1.86	mph		
							and					
							(					
							fuel rail pressure control in fuel pressure regulator 2 mode	=	TRUE	-		
							or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					fuel rail pressure control in combined pressure control (CPC) mode	= TRUE -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
		Detects a biased sensor by determining the FRP sensor voltage to be in the correct range for atmospheric pressure at engine off and with sufficient pressure bleed-off time.	rail pressure sensor voltage	< 0.352 V	engine post drive/ afterun	= TRUE -	fail conditions exists for more than 0.30 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	A
			or		and			
			rail pressure sensor voltage	> 0.65 V	fuel temperature	> -0.04 °C		
					and			
					engine has already run in this driving cycle	= TRUE -		
					and			
					rail pressure is reduced	= TRUE -		
					means			
					rail pressure does not exceed	< 0 kPa		
					and			
					fuel pressure regulator 2 current	<= 1700 mA		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time since engine off	>	30.08	sec		
							and					
							number of measurements during engine postdrive/ afterun	>	10	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		
Fuel Rail Pressure [FRP] Sensor Circuit Low	P0192	Detects low voltage readings on the FRP circuit, indicating an OOR low condition on the FRP circuit	rail pressure sensor voltage	<	0.189	V	ignition on	=	TRUE	-	fail conditions exists for 0.14 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as				and					
			rail pressure	<	0	kPa	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Rail Pressure [FRP] Sensor Circuit High	P0193	Detects high voltage readings on the FRP circuit, indicating an OOR high condition on the FRP circuit	rail pressure sensor voltage	>	4.81	V	ignition on	=	TRUE	-	fail conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as				and					
			rail pressure	>	220000	kPa	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Injector 1 Control Circuit	P0201	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 2 Control Circuit	P0202	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit	P0203	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 4 Control Circuit	P0204	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 5 Control Circuit	P0205	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit	P0206	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 7 Control Circuit	P0207	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 8 Control Circuit	P0208	Electronic out-put driver circuitry determines circuit integrity on the injector Control Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Turbocharger Engine Overboost	P0234	Detects an Overboost condition by comparing desired to measured boost values.	control deviation of the boost pressure calculated out of difference between desired and actual value (see Look-Up-Table #50)	<	-35.0 to - 12.5	kPa	engine Speed	>=	1450	rpm	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							engine Speed	<=	3200	rpm		
							injection Quantity	>=	132	mm^3 /rev		
							injection Quantity	<=	480	mm^3 /rev		
							turbocharger control deviation	>=	-100	%		
							turbocharger control deviation	<=	100	%		
							commanded turbocharger position	<	100	%		
							(					
							injection quantity is stable	=	TRUE	-		
							means					
							increase of injection quantity	<	60.00	(mm^ 3/rev)/ sec		
							and					
							engine speed is stable	=	TRUE	-		
							means					
							increase of engine speed	<	75	rpm/s ec		
							and					
							turbo charger (VNT) wiping is active	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					- in order to prevent soot accumulation e.g. in a long idle operation under cold engine condition on the turbine the desired value of the boost pressure actuator position governor is assigned from the set-point value					
					and					
					offset learning for turbo charger (VNT) actuator position sensor is active during idling	=	FALSE	-		
					- in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve					
					and					
					working range of boost pressure is in closed-loop	=	TRUE	-		
					means					
					(					
					engine speed	>	1200	rpm		
					and					
					injection quantity	>	20	mm^3 /rev		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>	2	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Engine Underboost	P0299	Detects an Underboost condition by comparing desired to measured boost values.	control deviation of the boost pressure calculated out of difference between desired and actual value (see Look-Up-Table #49)	>	17.5 to 40.0	kPa	engine Speed	>=	1450	rpm	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							engine Speed	<=	2000	rpm		
							injection Quantity	>=	132	mm^3 /rev		
							injection Quantity	<=	480	mm^3 /rev		
							(					
							injection quantity is stable means	=	TRUE			
							increase of injection quantity	<	60.00	(mm^3/rev)/sec		
							and					
							engine speed is stable	=	TRUE	-		
							means					
							increase of engine speed	<	75	rpm/sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					turbo charger (VNT) wiping is active - in order to prevent soot accumulation e.g. in a long idle operation under cold engine condition on the turbine the desired value of the boost pressure actuator position governor is assigned from the set-point value	=	FALSE	-		
					and					
					offset learning for turbo charger (VNT) actuator position sensor is active during idling	=	FALSE	-		
					- in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve					
					and					
					working range of boost pressure is in closed-loop	=	TRUE	-		
					means					
					(					
					engine speed	>	1200	rpm		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							injection quantity	>	20	mm^3 /rev		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>	2	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 1 Balance System	P0263	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity with	>	(c) * (b)	-	current injection quantity	>	52	mm^3 /rev		
							current injection quantity	<	200	mm^3 /rev		
			(a) lower limitation (see Look-Up-Table #40)	=	-44 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0	kPa		
			and with				engine speed	>	590	rpm		
			(b) factor for correction quantity	=	0.99	factor	engine speed	<	1500	rpm		
			and with				vehicle speed	<=	186.45	mph		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(c) upper limitation (see Look-Up-Table #41)	= 0 to 44 mm^3/rev	and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 2 Balance System	P0266	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	< (a) * (b) -	fuel balance control in closed loop (see closed loop conditions document for details)	= TRUE -	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or		and			
			fuel balance correction quantity with	> (c) * (b) -	current injection quantity	> 52 mm^3/rev		
					current injection quantity	< 200 mm^3/rev		
			(a) lower limitation (see Look-Up-Table #40)	= -44 to 0 mm^3/rev	engine coolant temperature	>= 39.96 °C		
					ambient pressure	>= 0 kPa		
			and with		engine speed	> 590 rpm		
			(b) factor for correction quantity	= 0.99 factor	engine speed	< 1500 rpm		
			and with		vehicle speed	<= 186.45 mph		
			(c) upper limitation (see Look-Up-Table #41)	= 0 to 44 mm^3/rev	and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 3 Balance System	P0269	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	< (a) * (b) -	fuel balance control in closed loop (see closed loop conditions document for details)	= TRUE -	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or		and			
			fuel balance correction quantity with	> (c) * (b) -	current injection quantity	> 52 mm^3 /rev		
					current injection quantity	< 200 mm^3 /rev		
			(a) lower limitation (see Look-Up-Table #40)	= -44 to 0 mm^3/rev	engine coolant temperature	>= 39.96 °C		
					ambient pressure	>= 0 kPa		
			and with		engine speed	> 590 rpm		
			(b) factor for correction quantity	= 0.99 factor	engine speed	< 1500 rpm		
			and with		vehicle speed	<= 186.45 mph		
			(c) upper limitation (see Look-Up-Table #41)	= 0 to 44 mm^3/rev	and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Balance System	P0272	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity with	>	(c) * (b)	-	current injection quantity	>	52	mm^3 /rev		
							current injection quantity	<	200	mm^3 /rev		
			(a) lower limitation (see Look-Up-Table #40)	=	-44 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0	kPa		
			and with				engine speed	>	590	rpm		
			(b) factor for correction quantity	=	0.99	factor	engine speed	<	1500	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #41)	=	0 to 44	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 5 Balance System	P0275	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity with	>	(c) * (b)	-	current injection quantity	>	52	mm^3/rev		
							current injection quantity	<	200	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #40)	=	-44 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0	kPa		
			and with				engine speed	>	590	rpm		
			(b) factor for correction quantity	=	0.99	factor	engine speed	<	1500	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #41)	=	0 to 44	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Balance System	P0278	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity with	>	(c) * (b)	-	current injection quantity	>	52	mm^3/rev		
							current injection quantity	<	200	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #40)	=	-44 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0	kPa		
			and with				engine speed	>	590	rpm		
			(b) factor for correction quantity	=	0.99	factor	engine speed	<	1500	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #41)	=	0 to 44	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Balance System	P0281	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity with	>	(c) * (b)	-	current injection quantity	>	52	mm^3/rev		
							current injection quantity	<	200	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #40)	=	-44 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0	kPa		
			and with				engine speed	>	590	rpm		
			(b) factor for correction quantity	=	0.99	factor	engine speed	<	1500	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #41)	=	0 to 44	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Balance System	P0284	Detects if the injection system is at the control limits by monitoring the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current injection quantity	>	52	mm^3/rev		
			with				current injection quantity	<	200	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #40)	=	-44 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0	kPa		
			and with				engine speed	>	590	rpm		
			(b) factor for correction quantity	=	0.99	factor	engine speed	<	1500	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #41)	=	0 to 44	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
CAC Efficiency Below Threshold	P026A	Detects insufficient charge-air cooler efficiency. The efficiency is calculated out of temperature upstream of the cooler, temperature downstream of the cooler and ambient temperature	filtered charge-air cooler efficiency	<	0.2000	-	vehicle speed	>=	31.08	mph	fail conditions exists for 30 s monitor runs once per driving cycle with 0.1 s rate whenever enable conditions are met	B
							and					
							(					
							air mass flow	>=	13.89	g/sec		
							and					
							air mass flow (see Look-Up-Table #15)	<=	55.56 to 277.78	g/sec		
							)					
							and					
							(					
							engine temperature	>=	69.96	°C		
							and					
							engine temperature	<=	122.96	°C		
							)					
							and					
							(					
							(maximum value of (a) and (b)) the maximum value is then divided by (b) with	>=	1.22	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(a) boost pressure downstream compressor	=	measured parameter]	-		
					and with					
					(b) ambient pressure	=	measured parameter]	-		
					)					
					and					
					(					
					control value of the throttle valve	>=	-400	%		
					and					
					control value of the throttle valve	<=	5.004883	%		
					)					
					and					
					diagnostic performed in current dc	=	FALSE	-		
					and					
					(a) - (b)	>=	40	°C		
					with					
					(a) temperature after compressor	=	measured parameter	-		
					and with					
					(b) ambient air temperature	=	measured parameter	-		
					and					
					injection quantity	>=	80	mm^3 /rev		
					and					
					ambient pressure	>	74.8	kPa		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					ambient temperature	>	-7.04	°C		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Flow Valve Control Circuit	P02E0	Detects open circuit faults on the intake air flow valve control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 5s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE			
					for					
					time	>	3	sec		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE		
					for			
					time	> 3 sec		
					and			
					Throttle Valve Actuator Solenoid Control Circuit	= ACTIVE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE			
					for					
					time	>	3	sec		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Flow Valve Control Circuit 1 Low Voltage	P02E2	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Intake Air Flow Valve Control Circuit 1 High Voltage	P02E3	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit Range Performance	P02E7	Detects in range TVA position errors by comparing the difference between desired and actual TVA position.	throttle valve control deviation calculated out of difference between desired and actual value	<	10	%	throttle valve controller bypass is active	=	FALSE	-	fail conditions exists for 0.010 s monitor runs with 0.005 s rate whenever enable conditions are met	B
			or				and					
			throttle valve control deviation calculated out of difference between desired and actual value	>	-10	%	throttle valve is driven to a mechanical stop	=	FALSE	-		
							and					
							Throttle Governor Active	=	TRUE	-		
							and					
							Throttle Valve Permanent Control Deviation	=	FALSE	-		
							and					
							throttle valve is detected as frozen means	=	TRUE	-		
							charge air cooler temperature	<	198.96	°C		
							and					
							engine speed (see Look-Up-Table #87)	>	600 to 850	rpm		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit High Voltage	P02E9	Detects high voltage readings on the throttle valve position sensor circuit, indicating an OOR high condition on the throttle valve position sensor circuit	measured throttle valve position value via sensor	> 94.99 %	ignition	= on -	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Diesel Intake Air Flow Position Sensor Circuit Low Voltage	P02E8	Detects low voltage readings on the throttle valve position sensor circuit, indicating an OOR low condition on the throttle valve position sensor circuit	measured throttle valve position value via sensor	< 5.01 %	ignition	= on -	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Flow Valve Control Motor Current Performance	P02EB	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Engine Misfire Detected	P0300	Indicates engine has experienced more than one cylinder misfiring	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
			and				and					
			misfires exist on more than one cylinder	=	TRUE	-	|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		
							and					
							current injection quantity	<	400	mm^3 /rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					vehicle speed	<=	1.86	mph		
					and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	counts		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 1 Misfire Detected	P0301	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	counts		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 2 Misfire Detected	P0302	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
					and					
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.								
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	counts		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 7 Misfire Detected	P0307	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	counts		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 8 Misfire Detected	P0308	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	count s		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 4 Misfire Detected	P0304	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	counts		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 5 Misfire Detected	P0305	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	count s		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Misfire Detected	P0306	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	< -1.3999 -	(		fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and		Engine Running (see parameter definition)	= TRUE -		
			evaluated crankshaft revolutions	>= (a) * (b) -	and			
			with		engine speed	> 400 rpm		
			(a) number of crankshaft revolutions per block	= 20 revs	and			
			and with		engine speed	< 1300 rpm		
			(b) number of test blocks	= 20 counts	)			
					and			
					|(a) - (b)|	< 200 rpm		
					with			
					(a) actual desired idle speed	= calculated parameter -		
					and with			
					(b) engine speed	= measured parameter -		
					and			
					(			
					current injection quantity	> 20 mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					current injection quantity	< 400 mm^3/rev		
					)			
					and			
					engine coolant temperature	>= 39.96 °C		
					and			
					vehicle speed	<= 1.86 mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and			
					time since start	>= 10 sec		
					and			
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	= TRUE -		
					and			
					adaptation value for tooth wheel has been learned	= TRUE -		
					and			
					number of detected misfires	> 140 counts		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 3 Misfire Detected	P0303	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cylinders are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.3999	-	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	400	rpm		
			(a) number of crankshaft revolutions per block	=	20	revs	and					
			and with				engine speed	<	1300	rpm		
			(b) number of test blocks	=	20	counts	)					
							and					
							|(a) - (b)|	<	200	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	20	mm^3 /rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					current injection quantity	<	400	mm^3 /rev		
					)					
					and					
					engine coolant temperature	>=	39.96	°C		
					and					
					vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.			and					
					time since start	>=	10	sec		
					and					
					deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
					and					
					adaptation value for tooth wheel has been learned	=	TRUE	-		
					and					
					number of detected misfires	>	140	count s		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Crankshaft Position System Variation Not Learned	P0315	Wheel Learn - Fuel Balance System - Tooth Wheel Variation and Crankshaft Dynamics not learned quickly enough	fuel balance wheel learn complete	=	FALSE	-	fuel system is in fuel cut off	=	TRUE	-	fail conditions exists for 5000 s cumulative time monitor runs with 1 s rate whenever enable conditions are met	B
		Path 1:					engine speed	>	900	rpm		
		Low Speed Learn Range or					engine speed	<	1450	rpm		
		Path 2:					engine speed	>=	1450	rpm		
		Mid Speed Learn Range					engine speed	<	1900	rpm		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Crankshaft Position [CKP] Sensor Circuit	P0335	Detects crankshaft sensor circuit failure by monitoring for valid signals from CKP sensor while CMP sensor is also sending valid signals	ECM has detected reference mark on the crankshaft	=	FALSE	-	set condition				fail conditions exists for more than 6 events monitor runs with 0.1 s rate whenever enable conditions are met	A
			and				(					
			number of detected camshaft rotations	>=	6	counts	(					
							engine speed	>=	400	rpm		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					synchronization completed	=	TRUE			
					)					
					or					
					starter is active cranking	=	TRUE			
					)					
					and					
					(					
					vehicle speed	=	0	mph		
					or					
					vehicle speed	>	16	mph		
					and					
					engine speed	>=	200	rpm		
					)					
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and not					
					reset condition					
					(					
					engine speed	<	200	rpm		
					and					
					starter is active cranking	=	FALSE	-		
					)					
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Crankshaft Position Sensor Performance	P0336	Detects implausible crankshaft sensor operation by detecting incorrect crank sensor signal patterns.	number of disturbances in crankshaft signal	>=	10	counts	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			crankshaft signal disturbance detected under the following conditions:				and					
			Current tooth time period	>	166667	us	basic enable conditions met:	=	see sheet enable tables	-		
			or									
			Crankshaft tooth counts between detected gaps	>	68	counts						
			or									
			If gap not expected, ratio of current tooth time to previous tooth time (see Look-Up-Table #20)	>	1.5 to 2	ratio						
			or									
			If gap expected, ratio of current tooth time to previous tooth time (see Look-Up-Table #19)	>	3.375 to 8	ratio						
Camshaft Position [CMP] Sensor Performance	P0341	Detects implausible camshaft sensor operation by detecting incorrect cam sensor patterns	number of camshaft edges	>	4	edges	ECM has detected reference mark on the crankshaft	=	TRUE	-	fail conditions exists for more than 6 events test performed continuously 0.01 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position [CMP] Sensor Circuit	P0340	Detects camshaft sensor circuit failure by monitoring for valid signals from CMP sensor while CKP sensor is also sending valid signals	number of crankshaft revolutions during missed camshaft signal	>= 4 revs	ECM has detected reference mark on the crankshaft	= TRUE -	fail conditions exists for 0.01 s test performed continuously 0.01 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
Wait to Start (WTS) Lamp Control Circuit	P0381	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		lamp is commanded on	= TRUE -	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					)			
					and			
					(			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					basic enable conditions met:	=	see sheet enable tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		lamp is commanded off	=	TRUE	-	fail conditions exists for 1.0 s monitor runs with 0.01 s rate whenever enable conditions are met	
					and					
					(					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					)					
					and					
					(					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		circuit active at low current	=	TRUE		fail conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	
					and					
					(					
					battery voltage	>	11	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for					
							time	>	3	sec		
							)					
							and					
							(					
							battery voltage	<	655.34	V		
							for					
							time	>	3	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Flow Excessive	P0400	Detects excessive EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the air mass = actual minus desired value	>	2	g/rev	(				fail conditions exists for 15 s monitor runs 0.02 s rate whenever enable conditions are met	A
							EGR controller is active	=	TRUE	-		
							and					
							VGT offset learning is active	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow Insufficient	P0401	Detects insufficient EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the exhaust gas recirculation (EGR) - calculated out of desired and actual value	>	(a) * (b)		(				fail conditions exists for 10 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				EGR controller is active	=	TRUE	-		
			(a) Minimum Controller Deviation	=	-0.7	g/rev	and					
			(b) Environmental Pressure correction factor (see Look-Up-Table #11)	=	0.6 to 1	factor	(					
							change of injection quantity between actual and last received value	<	80.00	(mm^3/rev)/sec		
							with					
							low-pass filter time	=	0.25	sec		
							)					
							and					
							(					
							change of engine speed between actual and last received value	<	75	rpm/sec		
							with					
							low-pass filter time	=	1.00	sec		
							)					
							and					
							VGT offset learning is active	=	FALSE			
							maximum setpoint for air-mass flow	>	1000	mm^3/rev		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Engine speed	<=	950	rpm		
					and					
					Engine speed	>=	575	rpm		
					and					
					Torque generating engine fuel injection quantity	<=	72	mm^3 /rev		
					and					
					Torque generating engine fuel injection quantity	>=	20	mm^3 /rev		
					and					
					setpoint valve position of exhaust-gas recirculation	>	5.00	%		
					and					
					throttle position	<	5	%		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					)					
					for					
					for time	>=	3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Flow Excessive	P0402	Detects excessive EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the exhaust gas recirculation (EGR) - calculated out of desired and actual value	> (a) * (b) -	(		fail conditions exists for 8 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with		EGR controller is active	= TRUE -		
			(a) Maximum Controller Deviation (see Look-Up-Table #13)	= 0.4 to 1.2 g/rev	and			
			(b) Environmental Pressure correction factor (see Look-Up-Table #10)	= 1 to 2 factor	(			
					change of injection quantity between actual and last received value	< 80.00 (mm^3/rev)/sec		
					with			
					low-pass filter time	= 0.25 sec		
					)			
					and			
					(			
					change of engine speed between actual and last received value	< 75 rpm/sec		
					with			
					low-pass filter time	= 1.00 sec		
					)			
					and			
					VGT offset learning is active	= FALSE -		
					maximum setpoint for air-mass flow	< 960 mm^3/rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					Engine speed	<=	1700	rpm		
					and					
					Engine speed	>=	1150	rpm		
					and					
					Torque generating engine fuel injection quantity	<=	480	mm^3 /rev		
					and					
					Torque generating engine fuel injection quantity	>=	160	mm^3 /rev		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					)					
					for					
					for time	>=	1.5	sec		
Exhaust Gas Recirculation (EGR) Motor Control Circuit	P0403	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 5 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and					
					offset learning for EGR valve is completed	=	TRUE	-		
					and					
					engine pre drive	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for			
					time	> 1 sec		
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	= ACTIVE	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
					and			
					(			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Position Sensor Circuit Low Voltage	P0405	Detects low voltage readings on the EGR position circuit, indicating an OOR low condition on the EGR position circuit	raw voltage of EGR actuator position sensor	< 0.25 V	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
			same as		and			
			EGR actuator position	< -25 %	basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Position Sensor Circuit High Voltage	P0406	Detects high voltage readings on the EGR position circuit, indicating an OOR high condition on the EGR position circuit	raw voltage of EGR actuator position sensor	>	4.8	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
			same as				and					
			EGR actuator position	>	127	%	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit High Voltage	P040D	Detects high voltage readings on the EGR temperature cooler circuit, indicating an OOR high condition on the EGR cooler temperature 1 circuit	EGR temperature sensor 2 voltage	>	4.838	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				time since engine start	>	0	sec		
			EGR sensor 2 temperature	<	-50	°C	and					
							engine coolant temperature	>	-60.04	°C		
							and					
							ambient temperature	>	-60.04	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					ambient pressure	>	20	kPa		
					and					
					(					
					setpoint valve position of exhaust-gas recirculation	>	-100	%		
					and					
					setpoint valve position of exhaust-gas recirculation	<	200	%		
					)					
					and					
					Engine Running (see parameter definition)	=	TRUE	-		
					and					
					current injection quantity	>	0	mm^3 /rev		
					and					
					(					
					valve position of EGR cooler bypass	>	-100	%		
					and					
					valve position of EGR cooler bypass	<	200	%		
					)					
					)					
					for					
					time	>	0	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit Low Voltage	P040C	Detects low voltage readings on the EGR cooler temperature circuit, indicating an OOR low condition on the EGR cooler temperature 1 circuit	EGR temperature sensor 2 voltage	<	0.4642	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				time since engine start	>	0	sec		
			EGR sensor 2 temperature	>	220	°C	and					
							engine coolant temperature and	<	199.96	°C		
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20	kPa		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>	-100	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<	200	%		
							)					
							and					
							Engine Running (see parameter definition) and	=	TRUE	-		
							(					
							valve position of EGR cooler bypass and	>	-100	%		
							valve position of EGR cooler bypass	<	200	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					for			
					time	> 0 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Exhaust Gas Recirculation (EGR) Temperature Sensor Correlation (EGR 1/ EGR 2)	P040F	Detects biased EGR temperature sensors by comparing the two EGR cooler temp sensor after an engine off soak time	**Path 1:**		|(a) - (b)|	<= 20 °C	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #6) with	> 100 to 999 °C	with			
					(a) captured EGR sensor 2 temperature at start	= measured parameter -		
			(a) captured EGR sensor 2 temperature at start	= measured parameter -	and with			
			and with		(b) captured EGR sensor 1 temperature at start as reference temperature	= measured parameter -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(b) captured EGR sensor 1 temperature at start	= measured parameter -	and			
			or		minimum engine-off time	>= 28800 sec		
					and			
			Path 2:		ambient temperature	> -60.04 °C		
			(		and			
			|(a) - (b)| (see Look-Up-Table #6)	<= 100 to 999 °C	Engine Running (see parameter definition)	= TRUE -		
			with		for			
			(a) captured EGR sensor 2 temperature at start	= measured parameter -	time	> 0 sec		
			and with		and			
			(b) captured EGR sensor 1 temperature at start	= measured parameter -	engine post drive/ afterun	= FALSE -		
			and		and			
			|(a) - (b)| (see Look-Up-Table #9)	> 20 to 999 °C	diagnostic performed in current dc	= FALSE -		
			with		and			
			(a) captured EGR sensor 2 temperature at start	= measured parameter -	basic enable conditions met:	= see sheet enable tables -		
			and with		and			
			(b) captured EGR sensor 1 temperature at start	= measured parameter -	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			and					
			(					
			status of block heater (see parameter definition)	= FALSE -				
			or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			status of sun-load detection (see parameter definition)	=	FALSE	-						
			)									
			)									
Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit High Voltage	P041D	Detects high voltage readings on the EGR cooler temperature circuit, indicating an OOR high condition on the EGR cooler temperature 2 circuit	voltage of EGR temperature sensor 1	>	4.838	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				time since engine start	>	0	sec		
			EGR sensor 1 temperature	<	-50	°C	and					
							engine coolant temperature	>	-60.04	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20	kPa		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>	-100	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<	200	%		
							)					
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Running (see parameter definition)	= TRUE -		
					and			
					current injection quantity	> 0 mm^3 /rev		
					and			
					(			
					valve position of EGR cooler bypass	> -100 %		
					and			
					valve position of EGR cooler bypass	< 200 %		
					)			
					)			
					for			
					time	> 0 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit Low Voltage	P041C	Detects low voltage readings on the EGR cooler temperature circuit, indicating an OOR low condition on the EGR cooler temperature 2 circuit	voltage of EGR temperature sensor 1	< 0.4642 V	(		fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as		time since engine start	> 0 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			EGR sensor 1 temperature	> 220 °C	and			
					engine coolant temperature	< 199.96 °C		
					and			
					ambient temperature	> -60.04 °C		
					and			
					ambient pressure	> 20 kPa		
					and			
					(			
					setpoint valve position of exhaust-gas recirculation	> -100 %		
					and			
					setpoint valve position of exhaust-gas recirculation	< 200 %		
					)			
					and			
					Engine Running (see parameter definition)	= TRUE -		
					and			
					(			
					valve position of EGR cooler bypass	> -100 %		
					and			
					valve position of EGR cooler bypass	< 200 %		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NMHC Catalyst Efficiency Below Threshold Bank 1	P0420	Detects insufficient conversion rate in oxidation catalyst. Actual conversion rate is compared to a conversion rate threshold as an indication of how much HC is converted in the oxidation catalyst.	Calculated HC conversion rate	<	0.2000	-					fail conditions exists for more than 0.1 seconds monitor runs once per driving cycle with 0.1 s rate whenever enable conditions are met	B
							(					
							Modeled HC mass converted in the oxidation catalyst since monitor start	>	140	g		
							and					
							average HC mass flow	>	0.0009	g/sec		
							and					
							simulated heat quantity in oxidation catalyst	>	0	kJ		
							and					
							particulate filter regeneration	=	TRUE	-		
							and					
							no reset condition for evaluation is active therefore					
							(					
							regeneration was not aborted to assure that HC conversion was not disturbed	=	TRUE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					evaluation took place one time step before (to ensure P0420 has not already completed)	=	FALSE	-		
					)					
					and					
					there has been sufficient HC integrated in order to evaluate the monitor conversion efficiency.	=	TRUE	-		
					means					
					(					
					set condition					
					particulate filter regeneration	=	TRUE	-		
					and					
					measured temperature upstream of the oxidation catalyst	>	249.96	°C		
					and					
					)					
					and					
					(					
					engine speed	>	700	rpm		
					and					
					engine speed	<	3400	rpm		
					)					
					and					
					diagnostic performed in current dc	=	FALSE	-		
					and					
					reset condition	=	FALSE	-		
					which becomes False under following conditions					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					converted HC mass in the oxidation catalyst during monitoring	< 140 g		
					)			
					or			
					particulate filter regeneration	= FALSE -		
					or			
					regeneration was not aborted (to assure that HC conversion was disturbed)	= TRUE -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
Primary Fuel Sensor Performance	P0461	Detects an error in the primary fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	>= 100 miles	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with		for			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) total vehicle distance	=	measured parameter	-	time	>=	60	sec		
			and with				and					
			(b) change in mileage	=	calculated parameter	-	diagnosis tester connected	=	FALSE			
							and					
			and				fuel transfer pump active	=	FALSE			
			(c) - (d)	<	4.21	%	means					
			with				(					
			(c) maximum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	filtered fuel volume in primary tank	>	1724.58	%		
			and with				and					
			(c) minimum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	filtered fuel volume in secondary tank	<	0	%		
							for					
							time	>=	0	sec		
							and					
							cumulative transfer pump on time in current ignition cycle	>	0	sec		
							)					
							and					
							fuel level zone 3	=	TRUE			
							means					
							(					
							filtered fuel volume in primary tank	<	144.63	%		
							and					
							filtered fuel volume in secondary tank	>	0	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					or			
					fuel level zone 4	= TRUE		
					means			
					(			
					filtered fuel volume in primary tank	< 144.63 %		
					and			
					filtered fuel volume in secondary tank	<= 0 %		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Fuel Level Sensor 1 Circuit High	P0463	Detects high voltage readings in the fuel level sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 1	> 4.8 V	ignition on	= TRUE -	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
			same as		and			
			fuel level	< 0 %	basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Low	P0462	Detects low voltage readings in the fuel level sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 1	<	0.2	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
			same as				and					
			fuel level	>	100	%	basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Position Sensor Performance	P046C	Detects in range EGR valve position errors by comparing desired EGR position to actual EGR valve position	controller deviation of EGR valve calculated out of difference between desired and actual value	>	5.00	%	offset learning of EGR actuator active	=	FALSE		fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			or				and					
			controller deviation of EGR valve calculated out of difference between desired and actual value	<	-5.00	%	offset learning in the previous driving cycle was complete	=	TRUE			
							and					
							engine speed (see Look-Up-Table #87)	>	600 to 850	rpm		
							and					
							duty cycle of the Intake Air Heater output	<	5	%		
							and					
							battery voltage	>=	11	V		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					EGR Valve	=	ACTIVE	-		
					EGR Valve Jammed	=	FALSE	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Cooling Fan Speed Output Circuit	P0480	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s test performed continuously 0.02 s rate	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					and					
					ignition on	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
		This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 1 s test performed continuously 0.02 s rate	
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					and					
					ignition on	=	TRUE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan System Performance	P0483	Detects inability to control fan speed to desired RPM	fan speed difference between actual and commanded value	<= -500 rpm	PWM of fan driver output	>= 45.01 %	fail conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or		and			
			fan speed difference between actual and commanded value	>= 500 rpm	(			
					fan speed	< 5320 rpm		
					and			
					fan speed	> 400 rpm		
					)			
					and			
					engine coolant temperature	> 69.96 °C		
					and			
					fan drive speed rate of change	< 2000 rpm		
					and			
					fan speed weight factor	> 0.59 factor		
					calculated out of			
					(			
					(a) * (b) * (c) * (d)			
					with			
					(a) factor based on input shaft stability (see Look-Up-Table #35)	= 0 to 1 factor		
					and with			
					(b) factor based on intake air temperature (see Look-Up-Table #37)	= 0 to 1 factor		
					and with			
					(c) factor based on engine coolant temperature (see Look-Up-Table #36)	= 0 to 1 factor		
					and with			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(d) factor based on fan drive speed (see Look-Up-Table #34)	=	0 to 1	factor		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Cooling Fan Speed High	P0495	Detects a locked fan. When fan speed control solenoid is off, the fan speed should follow accessory drive input speed plus some slip.	fan speed (see Look-Up-Table #38)	>	400 to 1500	rpm	fluid volume in Clutch (see Look-Up-Table #39)	<	0.005 to 0.0115	l	fail conditions exists for 0.02 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			for				or					
			Error counter (800 counts is equivalent to 80 sec)	>=	800	counts	Maximum allowed clutch pump out time	>=	600 to 65534	sec		
							when					
							{					
							fan speed	>	1500	rpm		
							and					
							PWM of fan driver output	<=	45.00	%		
							and					
							ambient pressure	>	55.5	kPa		
							and					
							intake air temperature	>	-40.04	°C		
							and					
							time since engine off	>	0	sec		
							and					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					engine speed (see Look-Up-Table #87) for	>	600 to 850	rpm		
					time	>	0	sec		
					)					
					}					
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	P0489	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and					
					(					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	P0490	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and					
					(					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Control Position Not Learned	P049D	Detects adaptation values of EGR cooling bypass valve that are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	**Path 1:**		offset learning is active	= TRUE -	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	B
			(a) - (b)	> 30.00 %	active under following conditions			
			with		(			
			(a) maximum learned offset value for EGR valve	= calculated parameter -	engine coolant temperature	>= 5.06 °C		
			and with		and			
			(b) minimum learned offset value for EGR valve	= calculated parameter -	engine coolant temperature	<= 123.06 °C		
			or		)			
			Path 2:		and			
			(		(			
			learned offset value for EGR valve in the present driving cycle	> 23.33 %	battery voltage	>= 10 V		
			or		and			
			learned offset value for EGR valve in the present driving cycle	< -23.33 %	battery voltage	<= 30 V		
			)		)			
					and			
					EGR sweep has ended - no movement in EGR valve	= TRUE -		
					and			
					engine post drive/ afterun	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					engine was running during last driving cycle	= TRUE -		
					means			
					engine speed during last driving cycle	= 0 rpm		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
		Detects a jammed EGR valve during opening or closing the valve.	**Path 1:**		**Path 1:**		fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	
			EGR valve stuck during opening means	= TRUE -	EGR valve is opening	= TRUE -		
					or			
			(		**Path 2:**			
			(a) + (b)	>= 20.00732 %	EGR valve is closing	= TRUE -		
			with		and			
			(a) position of EGR valve	= measured parameter -	engine post drive/ afterun	= TRUE -		
			and with		and			
			(b) learned offset value of EGR valve in the previous driving cycle	= measured parameter -	offset learning active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			or		and			
			(a) - (c)	<= 0.012207 %	basic enable conditions met:	see sheet enable tables -		
			with					
			(a) position of EGR valve	= measured parameter -				
			and with					
			(c) position of EGR valve of previous process cycle	= measured parameter -				
			)					
			for					
			time	> 5 sec				
			or					
			Path 2:					
			EGR valve stuck during closing means	= TRUE -				
			(					
			position of EGR valve	<= (a) * (b) -				
			with					
			(a) reference position of the EGR valve in open position	= measured parameter -				
			and with					
			(b) factor for EGR valve close position	= 0.5 factor				
			or					
			|(c) - (d)|	> 0.024414 %				
			with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(c) position of EGR valve	=	measured parameter	-						
			and with									
			(d) position of EGR valve of previous process cycle	=	measured parameter	-						
			)									
			for									
			time	>	5	sec						
Idle Speed Too High	P0507	Detects an idle speed governor that is unable to achieve the desired idle speed and the idle speed is too high.	engine speed	>	minimum value of (a) **OR** (b + (b * c))		engine speed (see Look-Up-Table #87)	>=	600 to 850	rpm	fail conditions exists for 20 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum engine speed	=	2500	rpm	(					
			and with				engine coolant temperature	<	122.96	°C		
			(b) minimum idle speed setpoint	=	calculated parameter	-	and					
			and with				engine coolant temperature	>	-7.04	°C		
			(c) factor for calculation of engine speed interval	=	24.00	%	)					
							and					
							idle speed controller active	=	TRUE	-		
							and					
							vehicle speed	<	1.86	mph		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					no other torque demanding function active and	= TRUE -		
					setpoint torque of the speed controller and	> 0 Nm		
					engine speed and	> 300 rpm		
					basic enable conditions met: and	= see sheet enable tables -		
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Idle Speed Too Low	P0506	Detects an idle speed governor that is unable to achieve the desired idle speed and the idle speed is too low	engine speed	< maximum value of (a) **OR** (b - (b * c))	engine speed (see Look-Up-Table #87)	>= 600 to 850 rpm	fail conditions exists for 20 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			with		and			
			(a) minimum engine speed	= 300 rpm	(			
			and with		engine coolant temperature and	< 122.96 °C		
			(b) minimum idle speed setpoint	= calculated parameter -				
			and with		engine coolant temperature	> -7.04 °C		
			(c) factor for calculation of engine speed interval	= 24.00 %	)			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					idle speed controller active	= TRUE -		
					and			
					vehicle speed	< 1.86 mph		
					and			
					no other torque demanding function active	= TRUE -		
					and			
					setpoint torque of the speed controller	> 0 Nm		
					and			
					engine speed	> 300 rpm		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cooling Fan Speed Sensor Circuit	P0526	This diagnostic checks the circuit for electrical integrity during operation.	period is too long to measure	> 0.209 sec	engine speed	> 550 rpm	fail conditions exists for 3 s monitor runs with 0.020 s rate whenever enable conditions are met	B
			and		and			
			(		(			
			current state of the signal received from fan is low	= TRUE -	PWM of fan driver output	> 45.00 %		
			or		for			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			current state of the signal received from fan is high	=	TRUE	-	time	>	30	sec		
			)				)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P0546	Detects high voltage readings on the EGT 1 circuit, indicating an OOR high condition on the EGT 1 circuit	temperature sensor voltage upstream of oxidation catalyst	>	2.2066	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as				for					
			temperature upstream of oxidation catalyst	>	1000	°C	time	>	0	sec		
							and					
							ignition on	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P0545	Detects low voltage readings on the EGT 1 circuit, indicating an OOR low condition on the EGT circuit	temperature sensor voltage upstream of oxidation catalyst	< 0.6544 V	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as		for			
			temperature upstream of oxidation catalyst	< -50 °C	time	> 0 sec		
					and			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Cruise Control Resume Switch Circuit	P0567	Resume switch state indicates problem with the circuit	Resume Switch CAN message in high / active state	= TRUE -	ignition on	= TRUE -	fail conditions exists for 90 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
					and			
					input circuit active	= TRUE -		
					and			
					basic enable conditions met	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cruise Control Set Switch Circuit	P0568	Set switch state indicates problem with the circuit	Set Switch CAN message in high / active state	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 90 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cruise Control Input Circuit	P0575	Cruise control CAN communication monitoring	amount of errors in consecutive frames	>=	3	counts	ignition on	=	TRUE	-	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
			with				and					
			number of consecutive frames	=	10	counts	input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Brake Pedal Position Sensor - Circuit Low Voltage	P057C	Brake pedal voltage below a calibrated threshold for a calibrated period of time	Brake pedal position sensor voltage	<	0.25	V	ignition on	=	TRUE	-	fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met	A
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		
Brake Pedal Position Sensor - Circuit High Voltage	P057D	Brake pedal voltage above a calibrated threshold for a calibrated period of time	Brake pedal position sensor voltage	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met	A
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
ROM Memory Fault	P0601	Detects a fault in the ROM memory	ECM detects multiple errors in the ROM-memory by comparing a calculated checksum with a check word	=	TRUE	-	engine post drive/ afterun	=	TRUE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and					
							basic enable conditions met:		see sheet enable tables	-		
Control Module Not Programmed	P0602	Detects if the ECM is programmed.	ECM not programmed	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 0.01 s test performed test performed once per driving cycle during ECU initialization	A
							and					
							engine pre drive	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Control Module Internal Performance	P0606	Monitors that ECM is operating correctly at proper voltage. All internal hardware modules are communicating correctly.	SPI communication, data transfer lost	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 0.5 s test performed continuously with 0.01 s rate	A
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			faults detected in the SPI communication IC internal	>	184	counts	ignition on	=	TRUE	-	fail conditions exists for at least 0.64 s monitor runs once per trip during pre drive at least twice every 0.08s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	-	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	-	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			internal supply voltage	<	4.2	V	ignition on	=	TRUE	-		
			or				and					
			internal supply voltage	>	5.25	V	counter of reactivation attempt of power output stage	>=	2	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for 0.08s monitor runs once per trip during pre drive at least twice every 0.08s rate whenever enable conditions are met	
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			|(a) - (b)|	>	50	us	programmed energizing time for fuel injection has been read back	=	TRUE	-	fail conditions exists for at least 0.15 s monitor runs with 0.01 s rate whenever enable conditions are met	
			with				means					
			(a) measured energizing time for fuel injection	=	measured parameter	-	programmed energizing time for fuel injection	>=	0	-		
			and with				and					
			(b) programmed energizing time for fuel injection	=	measured parameter	-	measured energizing time for fuel injection has been read back	=	TRUE	-		
							means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					measured energizing time for fuel injection	>= 0 -		
					and			
					engine speed	> 1200 rpm		
					and			
					rail pressure	> 20000 kPa		
					and			
					engine test active via diagnosis tester	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
			Path 1:		engine speed	> 1200 rpm	fail conditions exists for at least 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			(		and			
			angle for pre injection quantity	< -32.98 degrees	engine test active via diagnosis tester	= FALSE -		
			or		and			
			angle for pre injection quantity	> 102.99 degrees	basic enable conditions met:	= see sheet enable tables -		
			)					
			or					
			Path 2:					
			(					
			angle for main injection quantity	< -32.98 degrees				
			or					
			angle for main injection quantity	> 40.52 degrees				
			)					
			or					
			Path 3:					
			(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			angle for post injection quantity 1 or	< -360.00 degrees				
			angle for post injection quantity 1)	> -67.00 degrees				
			or					
			Path 4:					
			(					
			angle for post injection quantity 2 or	< -83.00 degrees				
			angle for post injection quantity 2)	> 40.52 degrees				
			or					
			Path 5:					
			(					
			angle for post injection quantity 3 or	< -83.00 degrees				
			angle for post injection quantity 3)	> 0.00 degrees				
			(		redundant engine speed calculation and	>= 1200 rpm	fail conditions exists for at least 0.5 s monitor runs with 0.04 s rate whenever enable conditions are met	
			energizing times of the correction value for pre injection quantity (see Look-Up-Table #47) or	< -500 to -50 us				
					engine test active via diagnosis tester and	= FALSE -		
			energizing times of the correction value for pre injection quantity (see Look-Up-Table #46)	> 50 to 500 us				

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			)		basic enable conditions met:	= see sheet enable tables -		
			redundant post injection quantity 2 calculation	> 130 mm^3	engine test active via diagnosis tester and	= FALSE -	fail conditions exists for at least 0.2 s monitor runs with 0.04 s rate whenever enable conditions are met	
					change in injection operation mode requested and	= TRUE -		
					basic enable conditions met:	= see sheet enable tables -		
			averaged torque effective energizing time per cylinder (see Look-Up-Table #48)	> 200 to 6000 us	fuel system is in fuel cut off	= TRUE -	fail conditions exists for at least 0.2 s monitor runs with 0.04 s rate whenever enable conditions are met	
			and		for			
			activation counter (intervention) of the surge damper	>= 72 counts	time	> 0.65 sec		
					and			
					redundant engine speed calculation and	> 2040 rpm		
					general engine speed demand and	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					external drag torque demand	=	FALSE	-		
					and					
					external transmission torque demand	=	FALSE	-		
					and					
					((					
					cruise control active	=	FALSE	-		
					or					
					(					
					brake pedal status	=	TRUE	-		
					or					
					redundant brake pedal status	=	TRUE	-		
					)					
					for					
					time	>	2.8	sec		
					)					
					and					
					(					
					pedal position	=	0	%		
					or					
					redundant calculation of pedal position	=	0	%		
					for time	>	0.02	sec		
					)					
					and					
					(					
					redundant engine speed calculation after start detected	>	120	rpm		
					and					
					redundant engine speed calculation at start	>	1080	rpm		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
			redundant averaged wave correction quantity for pre injection	>= 5 mm^3	redundant engine speed calculation	>= 1200 rpm	fail conditions exists for at least 0.5 s monitor runs with 0.04 s rate whenever enable conditions are met	
			or		and			
			redundant averaged wave correction quantity for main injection	>= 5 mm^3	engine test is active via diagnosis tester	= FALSE -		
			or		and			
			redundant averaged wave correction quantity for post injection 2	>= 5 mm^3	basic enable conditions met:	see sheet enable tables -		
			or					
			redundant averaged wave correction quantity for post injection 3	>= 5 mm^3				
			(		(		fail conditions exists for 0.120 s monitor runs with 0.01 s rate whenever enable conditions are met	
			rail pressure	<= 16000 kPa	redundant voltage of rail pressure sensor	< 0.19 V		
			or		or			
			rail pressure	>= 204000 kPa	redundant voltage of rail pressure sensor	> 4.81 V		
					)			
					and			
					delay time	> 2.1 sec		
					and			
					redundant calculation of injections active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					redundant engine speed calculation	> 1000 rpm		
					and			
					engine test active via diagnosis tester	= FALSE -		
					and			
					basic enable conditions met:	see sheet enable tables -		
			internal supply voltage	< 4.2 V	ignition	= on -	fail conditions exists for 0.05 s test performed continuously with 0.01 s rate	
			or		and			
			internal supply voltage	> 5.25 V	basic enable conditions met:	= see sheet enable tables -		
			WDA (watch dog) shut off due to under voltage means	= TRUE -	shut off path test active	= FALSE -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
					and			
			internal supply voltage	< 4.2 V	battery voltage	> 8 V		
					for			
					time	> 0.1 sec		
					and			
					WDA (watch dog) line active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			WDA (watch dog) shut off due to overvoltage means	=	TRUE	-	shut off path test active	=	FALSE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and					
			internal supply voltage	>	5.25	V	WDA (watch dog) line active	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			WDA (watch dog) shut off due to internal security error	=	TRUE	-	shut off path test active	=	FALSE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and					
							WDA (watch dog) line active	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			WDA (watch dog) shut off because of corrupt question-and-answer communication	= TRUE -	ignition	= on -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
					and			
					WDA (watch dog) line active	= TRUE -		
					and			
					shut off path test active	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
			the actual response time from processor is not equal to the requested response-time	= TRUE -	ignition	= on -		
					and		fail conditions exists for more than 0.16 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			redundant, independent algorithm for plausibility fault of accelerator pedal signal for safety reasons:				fail conditions exists for 0.28 s monitor runs with 0.04 s rate whenever enable conditions are met	
			Path 1:		ignition	on -		
			|(maximum (a) (b)) - 2 * (maximum (c) (b))| with	> 0.29 V	and			
					basic enable conditions met:	= see sheet enable tables -		
			(a) voltage accelerator pedal 1	= measured parameter -	and			
			and with		engine test active via diagnosis tester	= FALSE -		
			(b) lower limit for accelerator pedal voltage	= 0.8 V	and			
			and with		Input signal fault present	= FALSE -		
			(c) voltage accelerator pedal 2	= measured parameter -	and			
			and		ADC fault present	= FALSE -		
			(					
			voltage accelerator pedal 1	> 1.4498 V				
			or					
			voltage accelerator pedal 2	> 1.4498 V				
			)					
			or					
			Path 2:					
			|(maximum (a) (b)) - 2 * (maximum (c) (b))| with	> 0.41 V				

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) voltage accelerator pedal 1	=	measured parameter	-						
			and with									
			(b) lower limit for accelerator pedal voltage	=	0.8	V						
			and with									
			(c) voltage accelerator pedal 2	=	measured parameter	-						
			and									
			(									
			voltage accelerator pedal 1	<=	1.4498	V						
			or									
			voltage accelerator pedal 2	<=	1.4498	V						
			)									
			no response to an injection request processor internal	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 0.16 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			no response to shut-off path test processor internal	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 184 events monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			no response to hardware activation request processor internal	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 98 events monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			no response from processor operative system	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 2 events monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			processor internal				and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			Path 1:				ignition	=	on	-	fail conditions exists for more than 0.12 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			repetitions of injection shut-off path test	>=	184	counts	and					
			or				injection shut-off path test	=	ACTIVE	-		
			Path 2:				and					
			(				basic enable conditions met:	=	see sheet enable tables	-		
			number of a powerstage test too few	<	2	counts						
			and									
			number of cylinders	>=	8	-						
			)									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			prevention of the execution of the shut-off path test	=	TRUE		ignition	=	on	-	fail conditions exists for 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
							and					
							injection shut-off path test	=	ACTIVE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			too few bytes received by monitoring module from CPU	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 10 events monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			means				and					
			bytes received by monitoring module from CPU as response	<	4	Bytes	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ECM detects interruption in the SPI communication processor internal	= TRUE -	ignition and basic enable conditions met:	= on - = see sheet enable tables -	fail conditions exists for more than 2 events monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			ECM detects plausibility error of the communication between controller and the monitoring module (2 processors in ECU) processor internal	= TRUE -	ignition and basic enable conditions met:	= on - = see sheet enable tables -	fail conditions exists for more than 5 events monitor runs at least twice every 0.08 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.
			redundant filtered supply voltage to injector chip 1 or	<	3.10	V	ignition and	=	on	-	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			redundant filtered supply voltage to injector chip 1	>	3.50	V	battery voltage and	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
			redundant filtered supply voltage to injector chip 2 or	<	3.10	V	ignition and	=	on	-	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			redundant filtered supply voltage to injector chip 2	>	3.50	V	battery voltage and	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
			internal injector driver chip 1 error IC internal	=	TRUE	-	Engine Running and	=	TRUE	-	fail conditions exists for more than 10 events monitor runs with 0.01 s rate whenever enable conditions are met	
							basic enable conditions met:		see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			internal injector driver chip 2 error IC internal	=	TRUE	-	Engine Running and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for more than 10 events monitor runs with 0.01 s rate whenever enable conditions are met	
			piezo injector actuator internal feedback voltage or piezo injector actuator internal feedback voltage	< >	0 33	V V	main injection and basic enable conditions met:	=	ACTIVE see sheet enable tables		fail conditions exists for more than 10 events monitor runs with 0.01 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.
			Path 1:				injection cut off demand from ECM internal monitoring	=	TRUE	-	fail conditions exists for 0.2 s test performed continuously with 0.02 s	
			engine speed	>	1500	rpm	and					
			or				basic enable conditions met:	=	see sheet enable tables	-		
			Path 2:									
			engine speed	>	1600	rpm						
			security torque limitation request due to implausible air system control requests	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			security torque limitation request due to implausible rail pressure request	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			security torque limitation request due to implausible quantity setpoint control requests	=	TRUE	-	ignition	=	on	-	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			indicated torque	>	(a) + (b) + (c) + (d)	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.5 s monitor runs with 0.04 s rate whenever enable conditions are met	
			with				and					
			(a) modeled inner engine torque	=	calculated parameter	-	basic enable conditions met:	=	see sheet enable tables	-		
			and with									
			(b) torque tolerance offset (see Look-Up-Table #45)		11.71875 to 99.609375	%						
			and with									
			(c) torque of engine speed controller	=	calculated parameter	-						
			and with									
			(d) torque of surge damper control	=	calculated parameter	-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			voltage of charging switch	>	210	V	ECM is in startup before injections are released	=	TRUE	-	fail conditions exists for more than 0.05 s monitor runs with 0.01 s rate whenever enable conditions are met	
			or				and					
			voltage of charging switch if buffer of a bank is not charged completely, or not at all	>	100	V	basic enable conditions met:	=	see sheet enable tables	-		
			error at startup of DC/DC converter of one bank	=	TRUE	-	ignition	=	on	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and					
							DC/DC converter is in startup	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			DC/DC converter cannot be switched off.	=	TRUE	-	ignition	=	on	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Control Module Analog to Digital Performance	P060B	Electronic ECM circuitry determines if ADC is correctly converting signals within the correct time periods.	time for calibration of ADC	>=	0.295	sec	ignition	=	on	-	fail conditions exists for 0.01 s test performed continuously 0.01 s	A
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			voltage at ADC test voltage input	<	4.73	V	ignition	=	on	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	
			or									
			voltage at ADC test voltage input	>	4.83	V	and					
							basic enable conditions met:	=	see sheet enable tables	-		
			|(a) - (b)|	>	0.15	V	ignition	=	on	-	fail conditions exists for at least 0.12 s monitor runs with 0.01 s rate whenever enable conditions are met	
			with				and					
			(a) voltage accelerator pedal signal 2 at internal ADC	=	measured parameter	-	(					
			and with				counter for steady state detection of the internal AD converter	>=	4	events		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) voltage accelerator pedal signal 2 at external ADC	=	measured parameter	-	means					
							|(a) - (b)|	<=	0.06	V		
							with					
							(a) voltage accelerator pedal signal 2 at internal ADC	=	measured parameter	-		
							and with					
							(b) voltage of the accelerator pedal signal 2 at the external ADC	=	measured parameter	-		
							or					
							counter for steady state detection of the external AD converter means	>=	4	events		
							(c) - (d)	<=	64.45	V		
							with					
							(c) voltage accelerator pedal signal 2 at external ADC	=	measured parameter	-		
							and with					
							(d) voltage of the accelerator pedal signal 2 at the internal ADC	=	measured parameter	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(				ignition	=	on	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	
			ratio metric correction factor	<	0.62	factor	and					
			or				basic enable conditions met:	=	see sheet enable tables	-		
			ratio metric correction factor	>	0.74	factor						
			)									
Internal Control Module Engine Speed (RPM) Performance	P061C	Monitors main and redundant engine speed calculations for agreement. Detects failure in engine speed calculation through redundant calculation algorithm.	|(a) - (b)|	>=	400	rpm	redundant calculated engine speed	>=	600	rpm	fail conditions exists for more than 8 events monitor runs with 0.04 s rate whenever enable conditions are met	B
			with				and					
			(a) redundant calculated engine speed	=	calculated parameter	-	engine synchronization	=	TRUE	-		
			and with				and					
			(b) engine speed	=	measured parameter	-	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	Each data block of memory is read for a check sum error and flags if a fault is found.	EEPROM sector reports faults regarding:				ignition	=	on	-	fail conditions exists for 0.01 s test performed continuously at the 0.01 s rate	A
			unable to erase or change whole EEPROM sector	=	TRUE	-	and					
			or				basic enable conditions met:	=	see sheet enable tables	-		
			read order is not successfully accomplished for more than amount of blocks	=	3	-						
			or									
			amount of write errors in current block	=	3	counts						
5 Volt Reference 1 Circuit	P0641	Sensor supply voltage circuitry determines if faults related to maintaining the voltage level exist.	sensor supply voltage 1	<=	4.6	V	ignition on	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference 2 Circuit	P0651	Sensor supply voltage circuitry determines if faults related to maintaining the voltage level exist.	sensor supply voltage 2	<= 4.6 V	ignition on	= TRUE -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	B
					and			
					basic enable conditions met:	= see sheet enable tables -		
5 Volt Reference 3 Circuit	P0697	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 3	<= 4.6 V	ignition on	= TRUE -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	B
					and			
					basic enable conditions met:	= see sheet enable tables -		
5 Volt Reference 4 Circuit	P06A3	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 4	<= 4.6 V	ignition on	= TRUE -	fail conditions exists for 1.0 s test performed continuously 0.01s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and basic enable conditions met:	= see sheet enable tables -		
5 Volt Reference 5 Circuit	P06D2	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 5	<= 4.6 V	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	B
Malfunction Indicator Lamp (MIL) Control Circuit	P0650	This diagnostic checks the MIL circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		lamp is commanded on and ignition and (battery voltage for time	= TRUE - = on - > 11 V > 3 sec	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	A (no MIL)

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		lamp is commanded off	= TRUE	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	
					and			
					ignition	= on -		
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		circuit active at low current	= TRUE	fail conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	
					and			
					ignition	= on -		
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors Serial Data Communication for request from TCM to illuminate the MIL.	Serial data communication from the TCM indicates the TCM has requested a MIL	= TRUE -	ignition on	= TRUE -	fail conditions exists for 1 s monitor runs once per trip with 0.25 s rate whenever enable conditions are met	A
					for time	> 0.25 sec		
					and			
					new message is received via CAN	= TRUE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					basic enable conditions met	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Park/Neutral Position (PNP) Switch Circuit High Voltage	P0851	Detects high voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	ECM (on-board control unit) sensed position based on PNP switch inputs to ECM indicates park or neutral and the GMLAN message from the TCM disagrees	= TRUE	(				fail conditions exist for more than 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>=	11	V		
					and					
					battery voltage	<=	655.34	V		
					)					
					and					
					engine speed	>=	650	rpm		
					and					
					vehicle speed	>=	14.9161	mph		
					and					
					engine torque	>=	120	Nm		
					and					
					accelerator pedal position	>=	0	%		
					and					
					(					
					selected gear position is park	=	FALSE	-		
					or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					selected gear position is neutral	= FALSE -		
					)			
					and			
					no validation fault in the transmission shift lever position received via CAN from TCM	= TRUE -		
					and			
					basic enable conditions:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852	Detects low voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	GMLAN Message for PNP position indicates park neutral and disagrees with ECM (on-board control unit) sensed position based on PNP switch inputs to ECM	= TRUE	(		fail conditions exist for more than 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>= 11 V		
					and			
					battery voltage	<= 655.34 V		
					)			
					and			
					engine speed	<= 7000 rpm		
					and			
					(			
					selected gear position is park	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					or			
					selected gear position is neutral	= TRUE -		
					)			
					and			
					no validation fault in the transmission shift lever position received via CAN from TCM	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Traction Control Input Signal	P0856	Detects a failure when a certain number of Traction Control System torque request messages within a defined message group checksum or rolling count values are incorrect	Error counter for Traction Control torque request message group	>= 3 counts	Traction Control Torque Request CAN Message Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	Special C
					and			
					no rolling count or protection errors on CAN Frame $1C7	= TRUE -		
					and			
					ignition on	= TRUE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump High Control Circuit Low Voltage	P1043	Detects a short circuit to ground on the high side of the Reductant Pump Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	<	10.5	V	fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					for time	<	3	sec		
					OR					
					battery voltage	>	11	V		
					and					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump High Control Circuit High Voltage	P1044	Detects a short circuit to battery on the high side of the Reductant Pump Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	<	10.5	V	fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	B
					for time	<	3	sec		
					OR					
					battery voltage	>	11	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					((					
					SCR system waiting for shut down in afterrun	=	TRUE	-		
					OR					
					SCR system in standby in afterrun	=	TRUE	-		
					)					
					ignition on	=	TRUE	-		
					)					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		
Reductant Purge Valve High Control Circuit High Voltage	P1046	Detects a short circuit to battery on the high side of the Reductant Purge Valve Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((				fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	B
					ECU Initialization tasks in progress	=	FALSE	-		
					)					
					OR					
					(					
					ECU Initialization tasks in progress	=	TRUE	-		
					for time	>	1	sec		
					)					
					((					
					Battery voltage	>	10.5	V		
					for time	>	3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					and					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector High Control Circuit Low Voltage	P1048	Detects a short circuit to ground on the high side of the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((				fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					ECU Initialization tasks in progress	=	FALSE	-		
					)					
					OR					
					(					
					ECU Initialization tasks in progress	=	TRUE	-		
					for time	>	1	sec		
					)					
					((					
					Battery voltage	>	10.5	V		
					for time	>	3	sec		
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector High Control Circuit High Voltage	P1049	Detects a short circuit to battery on the high side of the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((				fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					ECU Initialization tasks in progress	=	FALSE	-		
					)					
					OR					
					(					
					ECU Initialization tasks in progress	TRUE				
					for time	>	1	sec		
					)					
					((					
					Battery voltage	>	10.5	V		
					for time	>	3	sec		
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	P10CC	Electronic out-put driver circuitry determines circuit integrity on the diesel dosing valve control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 0.5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage	P10CD	Electronic out-put driver circuitry determines circuit integrity on the diesel dosing valve control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 3.0 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	P10CE	Detects high voltage readings on the diesel dosing valve high side powerstage or high side actuator circuit, indicating an OOR high condition on the diesel dosing valve powerstage or actuator circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 3.0 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage	<	655.34	V		
							for					
							time	>	3	sec		
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Charge Air Cooler Temperature Sensor Performance	P111C	Detects a biased charge air cooler temperature sensor downstream or charge air cooler temperature sensor upstream by comparing the respective values at startup.	**Path 1:**				|(a) - (b)|	<=	35	°C	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #5) with	>	100 to 999	°C	with					
							(a) captured charge air cooler downstream temperature at start	=	measured parameter	-		
			(a) captured charge air cooler downstream temperature at start	=	measured parameter	-	and with					
			and with				(b) captured charge air cooler upstream temperature at start as reference temperature	=	measured parameter	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(b) captured charge air cooler upstream temperature at start	= measured parameter -	and			
					minimum engine-off time	>= 28800 sec		
					and			
			or		ambient temperature	> -60.04 °C		
			Path 2:		and			
			(		engine speed (see Look-Up-Table #87)	> 600 to 850 rpm		
			|(a) - (b)| (see Look-Up-Table #5)	<= 100 to 999 °C	for			
			with		time	> 0 sec		
			(a) captured charge air cooler downstream temperature at start	= measured parameter -	and			
			and with		engine post drive/ afterun	= FALSE -		
			(b) captured charge air cooler upstream temperature at start	= measured parameter -	and			
			and		diagnostic performed in current dc	= FALSE -		
			|(a) - (b)| (see Look-Up-Table #8)	> 35 to 999 °C	and			
			with		basic enable conditions met:	= see sheet enable tables -		
			(a) captured charge air cooler downstream temperature at start	= measured parameter -	and			
			and with		NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) captured charge air cooler upstream temperature at start	=	measured parameter	-						
			and									
			(									
			status of block heater (see parameter definition)	=	FALSE	-						
			status of sun-load detection (see parameter definition)	=	FALSE	-						
			)									
Intake Air Temp Sensor 1 to Fuel Temp Sensor 1 Not Plausible	P112A	Detects bias Fuel Temperature Sensor or Intake Air Temperature Sensor by comparing the measured temperature at start.	**Path 1:**				minimum engine-off time	>=	28800	sec	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #4)	>	100 to 999	°C	and					
			where				ambient air temperature	>	-60.04	°C		
			(a) captured intake air temperature at start	=	measured parameter	-	and					
			and				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured fuel temperature at start	=	measured parameter	-	for					
							time	>	0	sec		
			or				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Path 2:				engine post drive/ afterun	=	FALSE	-		
			(				and					
			|(a) - (b)| (see Look-Up-Table #4)	<=	100 to 999	°C	diagnostic performed in current dc	=	FALSE	-		
			where				and					
			(a) captured intake air temperature at start	=	measured parameter	-	basic enable conditions met:	=	see sheet enable tables	-		
			and				and					
			(b) captured fuel temperature at start	=	measured parameter	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and									
			|(a) - (b)| (see Look-Up-Table #7)	>	20 to 999	°C						
			where									
			(a) captured intake air temperature at start	=	measured parameter	-						
			and									
			(b) captured fuel temperature at start	=	measured parameter	-						
			and									
			(									
			status of block heater (see parameter definition)	=	FALSE	-						
			or									
			status of sun-load detection (see parameter definition)	=	FALSE	-						
			)									
			)									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Temperature Sensors 3-4 Not Plausible	P113A	Detects biased SCR catalyst temperature sensor by comparing SCR catalyst temperature sensor to the particulate filter temperature sensor after an engine off soak time	|(a) - (b)| (see Look-Up-Table #63)	>	30 to 999	°C	Power on reset by ignition on	=	TRUE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			and with				Engine Running (see parameter definition)	=	TRUE	-		
			(a) captured downstream SCR catalyst temperature at start	=	measured parameter	-	for time	>	0	sec		
			(b) captured downstream Particulate Filter catalyst temperature at start	=	measured parameter	-	Engine off soak time	>=	28800	sec		
							ambient temperature	>	-60.04	°C		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11AF	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	>	(a) + (b)	factor	engine speed	<	2600.00	rpm	fail conditions exists for more than 1.0 s monitor runs with 0.1 s rate whenever enable	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			where				engine speed	>	1200	rpm	conditions are met	
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calculated O2 concentration	factor	Inner combusted quantity	<	180	mm^3 /rev		
			(b) Positive O2 concentration margin	=	0.05	factor	Inner combusted quantity	>	36	mm^3 /rev		
							Air mass per cylinder	<	1166.67	g/rev		
							Air mass per cylinder	>	611.11	g/rev		
							Status of binary lambda signal valid	=	TRUE	-		
							for time	>	0.5	sec		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g	This monitor runs once per trip	
							battery voltage	>	1.1	V		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration where	>=	(a) - (b)	factor		
							(a) random start calculated Oxygen concentration	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.1	factor		
							for time	>	0.1	sec		
							engine speed	<	4500	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							engine speed	>	600	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110	kPa		
							ambient pressure	>	50	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P11B2	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	<	(a) - (b)	factor	engine speed	<	2600.00	rpm	fail conditions exists for more than 1.0 s monitor runs with 0.1 s rate whenever enable conditions are met	
			where				engine speed	>	1200	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calculated O2 concentration	factor	Inner combusted quantity	<	180	mm^3 /rev		
			(b) Negative O2 concentration margin	=	0.1	factor	Inner combusted quantity	>	36	mm^3 /rev		
							Air mass per cylinder	<	1166.67	g/rev		
							Air mass per cylinder	>	611.11	g/rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Status of binary lambda signal valid	=	TRUE	-	This monitor runs once per trip	
					for time	>	0.5	sec		
					integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
					battery voltage	>	1.1	V		
					Deceleration fuel cut-off	=	FALSE	-		
					Injection active	=	TRUE	-		
					calculated oxygen concentration	<=	(a) + (b)	factor		
					calculated oxygen concentration	>=	(a) - (b)	factor		
					where					
					(a) random start calculated Oxygen concentration	=	measured parameter	-		
					(b) tolerance range of calculated Oxygen concentration	=	0.1	factor		
					for time	>	0.1	sec		
					engine speed	<	4500	rpm		
					engine speed	>	600	rpm		
					ambient temperature	<	122.96	°C		
					ambient temperature	>	-45.04	°C		
					ambient pressure	<	110	kPa		
					ambient pressure	>	50	kPa		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
HO2S Current Performance Bank 1 Sensor 2	P11B5	Compares the ratio of valid lambda signal time to total time with a threshold	ratio of valid lambda signal time to total time: (a) / (b)	<	0.1	ratio	NOx sensor's heater temperature has reached the set point	=	TRUE	-	fail conditions exists for more than 20 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			where				for time	>	120	sec		
			(a) time for which valid lambda signal received over CAN	=	measured parameter	-	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	=	TRUE	-		
			(b) total time for which diagnosis is enabled	=	calculated parameter	-	Reciprocal lambda change : | (a) - (b) | (see Look-Up-Table #42)	<=	0.1 to 22	factor		
							where					
							(a) Reciprocal lambda	=	measured parameter	-		
							(b) Filtered reciprocal lambda	=	calculated parameter	-		
							for time	>	5	sec		
							time for which diagnosis is enabled	>=	20	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CB	Detects a high deviation of the measured NOx sensor concentration from the modeled Nox concentration	Filtered NOx concentration deviation from model	>	0.70	-	The signal of the NOx sensor is ready	=	TRUE	-	fault exists for more than 10 s; monitor runs at 0.1 s once per trip	B
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							for time		15	sec		
							ambient pressure	>=	75.0	kPa		
							ambient pressure	<=	106	kPa		
							ambient temperature	>=	-7.04	°C		
							ambient temperature	<=	37.96	°C		
							filtered modeled Nox concentration percent positive deviation (see Look-Up-Table #68)	<=	0.050 to 0.075	-		
							filtered modeled Nox concentration percent negative deviation (see Look-Up-Table #69)	>=	0.050 to 0.075	-		
							for time	>	2	sec		
							time since start	>	30	sec		
							engine coolant temperature	>=	68.96	°C		
							engine coolant temperature	<=	123.06	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Exhaust gas temperature enable range for the plausibility check of the NOx sensor upstream from the SCR (see Look-Up-Table #80)	>0	0 to 1	-		
					Fuel Injection pattern (see Look-Up-Table #81)	=	0 to 58 24 = pilot 1 main 56 = pilot 2, pilot 1, main 58 = pilot 2, pilot 1, main, post 2 26 = pilot 1 main, post 2 0 = all off (overrun)	-		
					vehicle speed	>=	37.29	mph		
					for time	>	1	sec		
					Engine speed and injection quantity enable range for the plausibility check of the NOx sensor upstream from the SCR (see Look-Up-Table #71)	≠0	0 to 1	-		
					for time	>	0.5	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Diagnostic has not already completed this driving cycle	=	FALSE	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	Detects a high deviation of the measured NOx sensor concentration from the modeled Nox concentration	Filtered NOx concentration deviation from model (see Look-Up-Table #79)	<	-0.70 to - 0.33	-	The signal of the NOx sensor is ready	=	TRUE	-	fault exists for more than 10 s; monitor runs at 0.1 s once per trip	B
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							for time	>	15	sec		
							ambient pressure	>=	76	kPa		
							ambient pressure	<=	106	kPa		
							ambient temperature	>=	-7.04	°C		
							ambient temperature	<=	37.96	°C		
							filtered modeled Nox concentration percent positive deviation (see Look-Up-Table #68)	<=	0.050 to 0.075	-		
							filtered modeled Nox concentration percent negative deviation (see Look-Up-Table #69)	<=	0.050 to 0.075	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	2	sec		
					time since start	>	30	sec		
					engine coolant temperature	>=	68.96	°C		
					engine coolant temperature	<=	123.06	°C		
					Exhaust gas temperature enable range for the plausibility check of the NOx sensor upstream from the SCR (see Look-Up-Table #80)	>0	0 to 1	-		
					Fuel Injection pattern (see Look-Up-Table #81)		0 to 58	-		
							24 = pilot 1 main			
							56 = pilot 2, pilot 1, main			
							58 = pilot 2, pilot 1, main, post 2			
							26 = pilot 1 main, post 2			
							0 = all off (overrun)			
					vehicle speed	>=	37.29	mph		
					for time	>	1	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed and injection quantity enable range for the plausibility check of the NOx sensor upstream from the SCR (see Look-Up-Table #72)	≠0 0 to 1 -		
					for time	> 0.5 sec		
					Diagnostic has not already completed this driving cycle	= FALSE -		
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
Nox Sensor Current Performance Bank1 Sensor 1	P11DB	Detects a failure of the feedback performance of upstream NoX sensor	Ratio of valid to invalid upstream Nox sensor status time count	> 0.9 ratio	Sufficient number of valid and invalid NOx status time (sum of valid and invalid Nox status for diagnostic determination)	>= 20 sec	fault exists for more than 5 s; monitor runs at 0.1 s when enable conditions are met	B
					and			
					Engine Running (see parameter definition)	= TRUE -		
					for time (required for the NOx sensor to give valid response)	> 20 sec		
					and			
					Upstream NoX sensor detects a lean A/F mixture	= TRUE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Valid NOx signal from CAN is received (no Nox sensor communication failures)	=	TRUE	-		
					or					
					following conditions for time:	>	45	sec		
					battery voltage	>=	11	V		
					battery voltage	<=	655.34	V		
					SCR upstream temperature	>=	94.96	°C		
					SCR upstream temperature	<=	3003.56	°C		
					Engine Running (see parameter definition)	=	TRUE	-		
					for time (required for the NOx sensor to give valid response)	>	20	sec		
					and					
					Lambda signal is in steady state condition (see Look-Up-Table #30)	<=	0.3 to 10	-		
					for time	>=	5	sec		
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Nox Sensor Current Performance Bank1 Sensor 2	P11DC	Detects a failure of the feedback performance of downstream NoX sensor	Ratio of valid to invalid downstream Nox sensor status time count	>	0.9	ratio	Sufficient number of valid and invalid downstream NOx sensor status time (sum of valid and invalid Nox status for diagnostic determination)	>=	20	sec	fault exists for more than 5 s; monitor runs at 0.1 s when enable conditions are met	B
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20	sec		
							and					
							Downstream NoX sensor detects a lean A/F mixture	=	TRUE	-		
							and					
							Valid NOx signal from CAN is received (no Nox sensor communication failures)	=	TRUE	-		
							or					
							following conditions for time:	>	120	sec		
							battery voltage	>=	11	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					Downstream Lambda signal is in steady state condition (| measured lambda signal - filtered lambda signal |) (see Look-Up-Table #29)	<= 0.2 to 3.2 -		
					for time	>= 5 sec		
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
Injector 1 Control Circuit Shorted	P1224	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 2 Control Circuit Shorted	P1227	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector 3 Control Circuit Shorted	P122A	Electronic out-put driver circuitry determines that the injector circuit is shorted.	Electronic out-put driver circuitry determines that the injector circuit is shorted.		Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 4 Control Circuit Shorted	P1233	Electronic out-put driver circuitry determines that the injector circuit is shorted.	Electronic out-put driver circuitry determines that the injector circuit is shorted.		Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Control Circuit Shorted	P1236	Electronic out-put driver circuitry determines that the injector circuit is shorted.	Electronic out-put driver circuitry determines that the injector circuit is shorted.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 6 Control Circuit Shorted	P1239	Electronic out-put driver circuitry determines that the injector circuit is shorted.	Electronic out-put driver circuitry determines that the injector circuit is shorted.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector 7 Control Circuit Shorted	P1242	Electronic out-put driver circuitry determines that the injector circuit is shorted.	Electronic out-put driver circuitry determines that the injector circuit is shorted.		Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 8 Control Circuit Shorted	P1247	Electronic out-put driver circuitry determines that the injector circuit is shorted.	Electronic out-put driver circuitry determines that the injector circuit is shorted.		Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Intake Air Flow Valve Control Circuit Shorted	P122C	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage	<	655.34	V		
							for					
							time	>	3	sec		
							)					
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3	sec		
							and					
							Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P122D	Detects adaptation values of throttle valve that are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	throttle valve control deviation calculated out of difference between desired and actual value	<	-10	%	throttle valve controller bypass is active	=	FALSE	-	fail conditions exists for 10.05 s monitor runs once per driving cycle with 0.005 s rate whenever enable conditions are met	B
			or				and					
			throttle valve control deviation calculated out of difference between desired and actual value	>	10	%	throttle valve is driven to a mechanical stop	=	FALSE	-		
							and					
							throttle valve is detected as frozen	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					means			
					charge air cooler temperature	> 199.96 °C		
					and			
					offset learning for the throttle valve was successful in the previous driving cycle	= TRUE -		
					and			
					engine post drive/ afterun	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
		Detects implausible learned offset values.	**Path 1:**		(		fail conditions exists for 0.005 s monitor runs once per driving cycle with 0.005 s rate whenever enable conditions are met	
			learned throttle valve offset position at open or closed position	< -20 %	engine temperature	>= 4.96 °C		
			or		and			
			learned throttle valve offset position at open or closed position	> 20 %	engine temperature	<= 123.06 °C		
			or		)			
			Path 2:		and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			difference between the maximum and minimum positions learned at closed position	>	30	%	(					
			or				battery voltage	>=	8	V		
			Path 3:									
			difference between the maximum and minimum positions learned at open position	>	30	%	and					
							battery voltage	<=	30	V		
							)					
							and					
							Throttle Valve is not frozen consisting of:					
							(					
							charge air cooler temperature	>=	-2.04	°C		
							or					
							if					
							charge air cooler temperature	<	-2.04	°C		
							then					
							charge air cooler temperature	>	-1.04	°C		
							for					
							time		10	sec		
							)					
							and					
							engine speed	=	0	rpm		
							and					
							engine post drive/ afterun	=	TRUE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					basic enable conditions met:	=	see sheet enable tables	-		
Intake Air Flow Valve Control Circuit 2 High Voltage	P122F	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Flow Valve Control Circuit 2 Low Voltage	P122E	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					Throttle Valve Actuator Solenoid Control Circuit	= ACTIVE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Fuel Pressure Regulator 2 High Control Circuit Low Voltage	P125A	Electronic out-put driver circuitry determines circuit integrity on the pressure control valve circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					battery voltage	> 11 V		
					for			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Fuel Pressure Regulator 2 High Control Circuit High Voltage	P125B	Electronic out-put driver circuitry determines circuit integrity on the fuel pressure regulator 2 high control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 0.1 s monitor runs with 0.1s rate whenever enable conditions are met	B
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					engine post drive/ afterun	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure Performance	P128E	Actual rail pressure is compared to fixed absolute value to detect low or high rail pressure conditions.	rail pressure (see Look-Up-Table #57)	< 0 to 15000 kPa	(		fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	A
					state machine rail pressure control transitioning pressure control valve mode	= TRUE -		
					or			
					state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	= TRUE -		
					or			
					state machine rail pressure control equal transitioning to metering unit pressure control mode	= TRUE -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			rail pressure (see Look-Up-Table #62)	< 0 to 15000 kPa	(		fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	
					state machine rail pressure control equal to pressure control valve	= TRUE -		
					or			
					state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	= TRUE -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			rail pressure (see Look-Up-Table #60)	< 0 to 15000 kPa	state machine rail pressure control equal to metering unit control mode	= TRUE -	fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			rail pressure	> 215000 kPa	(		fail conditions exists for 1.01 s. monitor runs with 0.02 s rate whenever enable conditions are met	
					state machine rail pressure control transitioning pressure control valve mode	= TRUE -		
					or			
					state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	= TRUE -		
					or			
					state machine rail pressure control equal transitioning to metering unit pressure control mode	= TRUE -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			rail pressure	>	2150000	kPa	(				fail conditions exists for 1.01 s. monitor runs with 0.02 s rate whenever enable conditions are met	
							state machine rail pressure control equal to pressure control valve	=	TRUE	-		
							or					
							state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure	>	215000	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-	fail conditions exists for 1.01 s. monitor runs with 0.02 s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 1 Injection Timing Retarded	P12B3	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 1	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	=	353.2 to 670.8	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			rail pressure point (see Look-Up-Table #21)	= 30000 to 90000 kPa	and			
					battery voltage	> 10 V		
					and			
					combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #90)	>= 5 to 30 sec		
					and			
					number of samples to discard prior to evaluating results	> 0 -		
					and			
					intake manifold pressure	> 75 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					for			
					time	> 0 sec		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30 rpm		
					and with			
					(b) minimum engine speed	= 950 rpm		
					and with			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(c) maximum engine speed)	=	1850	rpm		
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 2 Injection Timing Retarded	P12B5	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 2	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	=	353.2 to 670.8	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					number of samples to discard prior to evaluating results	>	0	-		
					and					
					intake manifold pressure	>	75	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Injection Timing Retarded	P12BF	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 3	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	=	353.2 to 670.8	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					
							number of samples to discard prior to evaluating results	>	0	-		
							and					
							intake manifold pressure	>	75	kPa		
							and					
							accelerator pedal position	<	0.05	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					4 wheel mode	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 8 Injection Timing Retarded	P12C1	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	> -7.04 °C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 4	> (a) - (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	= 353.2 to 670.8 us	and			
			and with		fuel temperature	<= 79.96 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	= 10 to 16 us	)			
			)		and			
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point (see Look-Up-Table #21)	= 30000 to 90000 kPa	and			
					battery voltage	> 10 V		
					and			
					combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #90)	>= 5 to 30 sec		
					and			
					number of samples to discard prior to evaluating results	> 0 -		
					and			
					intake manifold pressure	> 75 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					for			
					time	> 0 sec		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Injection Timing Retarded	P12B9	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 5	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	=	353.2 to 670.8	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					combustion chamber is not cold off means					
					time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
					and					
					number of samples to discard prior to evaluating results	>	0	-		
					and					
					intake manifold pressure	>	75	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 5 Injection Timing Retarded	P12BB	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 6	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	=	353.2 to 670.8	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					number of samples to discard prior to evaluating results	> 0 -		
					and			
					intake manifold pressure	> 75 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					for			
					time	> 0 sec		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30 rpm		
					and with			
					(b) minimum engine speed	= 950 rpm		
					and with			
					(c) maximum engine speed	= 1850 rpm		
					)			
					and			
					current gear (see Look-Up-Table #89)	= 0 to 1 -		
					and			
					vehicle speed	> 0 mph		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Injection Timing Retarded	P12BD	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 7	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	=	353.2 to 670.8	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					
							number of samples to discard prior to evaluating results	>	0	-		
							and					
							intake manifold pressure	>	75	kPa		
							and					
							accelerator pedal position	<	0.05	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					Fuel system status	= Fuel cut off -		
					for			
					time	> 0 sec		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30 rpm		
					and with			
					(b) minimum engine speed	= 950 rpm		
					and with			
					(c) maximum engine speed	= 1850 rpm		
					)			
					and			
					current gear (see Look-Up-Table #89)	= 0 to 1 -		
					and			
					vehicle speed	> 0 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 2200 kPa		
					and			
					rail pressure is stable for at least	> 0.1 sec		
					and			
					no gear change is occurred	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					4 wheel mode	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 3 Injection Timing Retarded	P12B7	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	> -7.04 °C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 8	> (a) - (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		
			(a) maximum injection energizing time (see Look-Up-Table #22)	= 353.2 to 670.8 us	and			
			and with		fuel temperature	<= 79.96 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #23)	=	10 to 16	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					
							number of samples to discard prior to evaluating results	>	0	-		
							and					
							intake manifold pressure	>	75	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							for					
							time	>	0	sec		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 1 Injection Timing Advanced	P12B4	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. Detects a fault when the corrected energizing time falls below the allowed limit.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time and with	=	107.2	us	and					
							fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	=	56 to 123.2	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					combustion chamber is not cold off means					
					time since last combustion (see Look-Up-Table #90) and	>=	5 to 30	sec		
					number of samples to discard prior to evaluating results and	>	0	-		
					intake manifold pressure	>	75	kPa		
					and					
					accelerator pedal position and	<	0.05	%		
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed and with	=	950	rpm		
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 2 Injection Timing Advanced	P12B6	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. Detects a fault when the corrected energizing time falls below the allowed limit.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 2	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time and with	=	107.2	us	and					
							fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	=	56 to 123.2	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90) and	>=	5 to 30	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					number of samples to discard prior to evaluating results	>	0	-		
					and					
					intake manifold pressure	>	75	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Injection Timing Advanced	P12C0	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 3	< (a) + (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		
			(a) minimum injection energizing time	= 107.2 us	and			
			and with		fuel temperature	<= 79.96 °C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	= 56 to 123.2 us	)			
			)		and			
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point (see Look-Up-Table #21)	= 30000 to 90000 kPa	and			
					battery voltage	> 10 V		
					and			
					combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #90)	>= 5 to 30 sec		
					and			
					number of samples to discard prior to evaluating results	> 0 -		
					and			
					intake manifold pressure	> 75 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					4 wheel mode	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 8 Injection Timing Advanced	P12C2	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. Detects a fault when the corrected energizing time falls below the allowed limit.	(		environmental temperature	> -7.04 °C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 4	< (a) + (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		
			(a) minimum injection energizing time	= 107.2 us	and			
			and with		fuel temperature	<= 79.96 °C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	= 56 to 123.2 us	)			
			)		and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point (see Look-Up-Table #21)	= 30000 to 90000 kPa	and			
					battery voltage	> 10 V		
					and			
					combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #90)	>= 5 to 30 sec		
					and			
					number of samples to discard prior to evaluating results	> 0 -		
					and			
					intake manifold pressure	> 75 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					for			
					time	> 0 sec		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30 rpm		
					and with			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) minimum engine speed and with	=	950	rpm		
					(c) maximum engine speed)	=	1850	rpm		
					and					
					current gear (see Look-Up-Table #89) and	=	0 to 1	-		
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least and	>	0.1	sec		
					no gear change is occurred and	=	TRUE	-		
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 4 Injection Timing Advanced	P12BA	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 5	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	=	56 to 123.2	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					number of samples to discard prior to evaluating results	>	0	-		
					and					
					intake manifold pressure	>	75	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 5 Injection Timing Advanced	P12BC	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 6	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	=	56 to 123.2	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					
							number of samples to discard prior to evaluating results	>	0	-		
							and					
							intake manifold pressure	>	75	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least	>	0.1	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Injection Timing Advanced	P12BE	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. Detects a fault when the corrected energizing time falls below the allowed limit.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 7	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	=	56 to 123.2	us	)					
			)				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					
							number of samples to discard prior to evaluating results	>	0	-		
							and					
							intake manifold pressure	>	75	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							for					
							time	>	0	sec		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30	rpm		
							and with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) minimum engine speed and with	=	950	rpm		
					(c) maximum engine speed)	=	1850	rpm		
					and					
					current gear (see Look-Up-Table #89) and	=	0 to 1	-		
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2200	kPa		
					and					
					rail pressure is stable for at least and	>	0.1	sec		
					no gear change is occurred and	=	TRUE	-		
					4 wheel mode	=	FALSE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 3 Injection Timing Advanced	P12B8	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. Detects a fault when the corrected energizing time falls below the allowed limit.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 8	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	us	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #24)	=	56 to 123.2	us	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point (see Look-Up-Table #21)	=	30000 to 90000	kPa	and					
							battery voltage	>	10	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #90)	>=	5 to 30	sec		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					number of samples to discard prior to evaluating results	>	0	-		
					and					
					intake manifold pressure	>	75	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0	sec		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30	rpm		
					and with					
					(b) minimum engine speed	=	950	rpm		
					and with					
					(c) maximum engine speed	=	1850	rpm		
					)					
					and					
					current gear (see Look-Up-Table #89)	=	0 to 1	-		
					and					
					vehicle speed	>	0	mph		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 2200 kPa		
					and			
					rail pressure is stable for at least	> 0.1 sec		
					and			
					no gear change is occurred	= TRUE -		
					and			
					4 wheel mode	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cold Start Emission Reduction Control System	P1400	Detects problems resulting in improper delivery of fuel for catalyst light off and aftertreatment system preparation	**Path 1:**		engine operating mode	= exhaust warm-up state bit mask	fail conditions exists for 20 revs test performed continuously 0.01 s rate	B
			Post Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details)	= TRUE -	which means:			
					Cold Start Injection Monitoring	= ENABLE D -		
			or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine operating mode state transition	= FALSE -		
			Path 2:					
			Post Injection 2 is prohibited due to collision (overlap) with Main Injection and Post Injection 1 (see	= TRUE -				
			or					
			Path 3:					
			Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized (see	= TRUE -				
Exhaust Gas Recirculation (EGR) Motor Control Circuit Shorted	P1407	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	= ACTIVE -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
EGR Cooling Bypass Rationality	P140A	Detects adaptation values of EGR cooling bypass valve that are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	**Path 1:**		active cleaning mode of EGR cooler bypass valve - no movement in EGR cooling bypass valve	= FALSE -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			difference between the max and min EGR cooler bypass valve offset values	> 50 %	and			
			or		engine post drive/ afterrun	= TRUE -		
			Path 2:		and			
			learned offset value for EGR cooler bypass valve in the present driving cycle	> 16.00 %	(			
			or		battery voltage	>= 10 V		
			learned offset value for EGR cooler bypass valve in the present driving cycle	< -16.00 %	and			
			or		battery voltage	<= 30 V		
			Path 3:		)			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			mean value for EGR cooling bypass valve offset learned at the open end during the current driving cycle over multiple open-close cycles	>	13.00	%	and					
			or				(					
			mean value for EGR cooling bypass valve offset learned at the open end during the current driving cycle over multiple open-close cycles	<	-16.00	%	engine coolant temperature	>=	5.06	°C		
							and					
							engine coolant temperature	<=	123.06	°C		
							)					
							)					
							or					
							offset learning active	=	TRUE	-		
							or					
							diagnosis tester present	=	FALSE	-		
							)					
							and					
							completion of offset learning	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects a jammed EGR cooling bypass valve during opening or closing the valve.	**Path 1:**		EGR cooler bypass valve is opening	= TRUE -		
			EGR cooler bypass valve stuck during opening which means	= TRUE -	or			
					EGR cooler bypass valve is closing	= TRUE -		
			(		and			
			(a) + (b)	>= 75.01 %	engine post drive/ afterun	= TRUE -		
			with		and			
			(a) position of the EGR cooling bypass valve	= measured parameter -	offset learning active	= TRUE -		
			and with		and			
			(b) learned offset value of EGR cooler bypass valve in the previous driving cycle	= calculated parameter -	basic enable conditions met:	= see sheet enable tables -		
			or					
			(a) - (b)	<= 0.99 %				
			with					
			(a) position of the EGR cooling bypass valve	= measured parameter -				
			and with					
			(b) position of the EGR cooling bypass valve of the previous process cycle	= calculated parameter -				
			)					
			for time	> 5 sec				
			or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Path 2:							
			EGR cooler bypass valve stuck during closing which means	=	TRUE	-				
			(							
			position of the EGR cooling bypass valve	<	(a) * (b)	-				
			with							
			(a) reference position of the EGR cooling bypass valve in open position	=	calculated parameter	-				
			and with							
			(b) calibrateable factor of the EGR cooling bypass valve close position	=	0.15	factor				
			or							
			(a) - (b)	>=	0.02	%				
			with							
			(a) position of the EGR cooling bypass valve	=	calculated parameter	-				
			and with							
			(b) position of the EGR cooling bypass valve of the previous process cycle	=	calculated parameter	-				
			)							
			for time	>	5	sec				

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Recirculation Slow Response-Increasing Flow	P140B	Detects a negative slow response by comparing expected system dynamics with actual value	average negative gradient of the air mass - calculated by accumulating control deviation (deviation between desired and actual value) over a sampling time and dividing result by sampling time	>= 0.28 g/rev	(		fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable conditions are met	B
					Engine speed	<= 2000 rpm		
					and			
					Engine speed	>= 1300 rpm		
					)			
					and			
					(			
					injection quantity	<= 260 mm^3 /rev		
					and			
					injection quantity	>= 100 mm^3 /rev		
					)			
					and			
					ambient pressure	> 74.8 kPa		
					and			
					engine coolant temperature	> 69.96 °C		
					and			
					ambient temperature	> -7.04 °C		
					and			
					EGR control is in closed loop	= TRUE -		
					and			
					EGR control is active	= TRUE -		
					and			
					exhaust gas system regeneration mode	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and					
					Engine is running	=	TRUE	-		
					for					
					for time	>	0	sec		
					and					
					(					
					desired delta air mass flow	<	-0.01	g/sec		
					and					
					desired delta air mass flow	>	-0.1	g/sec		
					)					
					and					
					difference of the air mass	<	0	g/rev		
					)					
					for					
					for time	>	0.1	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation Slow Response-Decreasing Flow	P140C	Detects a positive slow response by comparing expected system dynamics with actual value	average positive gradient of the air mass - calculated by accumulating control deviation (deviation between desired and actual value) over a sampling time and dividing result by sampling time	>=	0.28	g/rev	(				fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable conditions are met	B
							Engine speed	<=	2000	rpm		
							and					
							Engine speed	>=	1300	rpm		
							)					
							and					
							(					
							injection quantity	<=	260	mm^3 /rev		
							and					
							injection quantity	>=	100	mm^3 /rev		
							)					
							and					
							ambient pressure	>	74.8	kPa		
							and					
							engine coolant temperature	>	69.96	°C		
							and					
							ambient temperature	>	-7.04	°C		
							and					
							EGR control is in closed loop	=	TRUE	-		
							and					
							EGR control is active	=	TRUE	-		
							and					
							exhaust gas system regeneration mode	=	FALSE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Engine is running	=	TRUE	-		
					for					
					for time		0	sec		
					and					
					(					
					desired delta air mass flow	<	0.1	g/sec		
					and					
					desired delta air mass flow	>	0.01	g/sec		
					)					
					and					
					difference of the air mass	<	0	g/rev		
					)					
					for					
					for time	>	0.2	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P140E	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and					
					(					
					battery voltage	>	11	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage	P140D	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	= ACTIVE -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor Current Performance	P140F	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	= ACTIVE -	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and			
					(			
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 2 Low Voltage	P1411	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 2 High Voltage	P1412	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit Shorted	P1413	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid. This failure detects a short between the two output circuits	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P1414	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too Low	P144B	Detects insufficient exhaust temperature. Actual inner controller ratio and temperature readings are compared to desired controller ratio and temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the inner control loop of the temperature controller	>=	0.99	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #25)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature setpoint for inner control loop	>	maximum of (a) and (b+(c-d))	-	time	>	0	sec		
			(				and					
			with				release of the exhaust gas temperature outer loop control monitoring	=	TRUE	-		
			(a) limitation of the temperature threshold and with	=	100	°C	means					
							(					
			(b) temperature threshold value for maximum deviation	=	100	°C	active operation mode of the inner control loop	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					means					
					(					
					particulate filter regeneration	=	TRUE	-		
					and					
					temperature before oxidation catalyst and temperature after particulate filter	>	99.96	°C		
					and					
					(					
					temperature before oxidation catalyst and temperature after particulate filter	<	649.96	°C		
					or					
					temperature before oxidation catalyst and temperature after particulate filter for activated post injection	<	649.96	°C		
					)					
					)					
					and					
					status maximum governor deviation	=	TRUE			
					means					
					vehicle speed	<=	124.30	mph		
					and					
					Relative accelerator pedal position	>	3.00	%		
					for					
					time	>	1	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too High	P144C	Detects excessive exhaust temperature. Actual inner controller ratio and temperature readings are compared to desired controller ratio and temperature values as an indication of an excessive exhaust gas temperature.	commanded control value of the inner control loop of the temperature controller	<=	0	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #26)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature setpoint for inner control loop	<	minimum of (a) and (b-(c-d))		time	>	0	sec		
			(				and					
			with				release of the exhaust gas temperature outer loop control monitoring	=	TRUE	-		
			(a) limitation of the temperature threshold and with	=	-100	°C	means					
							(					
			(b) temperature threshold value for minimum deviation	=	100	°C	active operation mode of the inner control loop	=	TRUE	-		
							means					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					particulate filter regeneration	=	TRUE	-		
					and					
					temperature before oxidation catalyst and temperature after particulate filter	>	99.96	°C		
					and					
					(					
					temperature before oxidation catalyst and temperature after particulate filter	<	649.96	°C		
					or					
					temperature before oxidation catalyst and temperature after particulate filter for activated post injection	<	649.96	°C		
					)					
					)					
					and					
					status maximum governor deviation means	=	TRUE			
					vehicle speed	<=	124.30	mph		
					and					
					Relative accelerator pedal position	>	3.00	%		
					for					
					time	>	1	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
TCM Engine Speed Request Signal Message Counter Incorrect	P150C	Detects implausible engine speed request information received from the TCM	**Path 1:**		ignition on	= TRUE -	fail conditions exists for 0.01 s test performed continuously 0.01 s	A
			(		and			
			time since last message from transmission was received	>= 7 counts	basic enable conditions met:	= see sheet enable tables -		
			with		and			
			number of consecutive frames	= 12 counts	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			)		and			
			or		No rolling count or protection value errors. (sliding window errors) on CAN frame	= TRUE -		
			Path 2:					
			(					
			internal calculated checksum value for transmission is not equal the received value	= TRUE -				
			and					
			number of fault results	> 15 counts				
			)					
			or					
			Path 3:					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			time since last frame of validation protection was received from transmission	>	0.08	sec						
Power Take Off	P1591	If the number of communication errors in a calibrated number of frames exceeds a threshold a permanent error is detected	Number of errors in window	>=	4	counts	Number of frames received	>=	10	counts	fail conditions exists for 0.05 s monitor runs with 0.05 s rate whenever enable conditions are met	Special C
							Can Bus Initialized consisting of:					
							ignition on	=	TRUE	-		
							for time	>	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	65.34	V		
Throttle Sensor Communication Circuit Performance	P16A2	Detects an error in the throttle sensor communication.	throttle valve position sensor communication circuit disturbed due to noise or wrong CRC (cyclic redundancy check)	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 8 s test performed continuously 0.005 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Throttle Sensor Communication Circuit High Voltage	P16A1	Detects high voltage readings on the throttle valve sensor communication circuit, indicating an OOR high condition on the throttle sensor communication circuit	sensor communication circuit voltage	>= 3 V	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.005 s rate	B
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Throttle Sensor Communication Circuit Low Voltage	P16A0	Detects low voltage readings on the throttle valve sensor communication circuit, indicating an OOR low condition on the throttle valve sensor communication circuit	sensor communication circuit voltage	<= 1.45 V	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.005 s rate	B
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Diesel Particulate Filter (DPF) Low Efficiency	P2002	Detects a DPF that is leaking particulates means it exceeds a PM threshold.	differential pressure of particulate filter (see Look-Up-Table #52)	< 0.8 to 10.7 kPa	particulate filter regeneration	= TRUE -	fail conditions exists for 20 s monitor runs 0.1 s rate whenever enable conditions are met	B
					and			
					(			
					particulate filter surface temperature	>= 99.96 °C		
					and			
					particulate filter surface temperature	<= 399.96 °C		
					)			
					and			
					exhaust-gas volume flow in the particulate filter	> 500 m^3/h		
					and			
					time since last successful regeneration	<= 1200 sec		
					and			
					distance since last regeneration of particulate trap	<= 30.175 miles		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Reductant Injector Performance	P202E	This diagnostic checks the Reductant Injector performance during operation.	Number of times the ECM detects that the commanded state of the Reductant Injector driver and the actual state of the control circuit do not match.	> 10 counts	Flag for successful measurement of current in opening phase of Reductant Injector	= TRUE -	fault exists for more than 80 injection events; monitor runs with 0.100 s rate whenever enable conditions are met	A
					(			
					Reductant Dosing System Metering control substate of Pressure control state (see definition)	= TRUE -		
					(			
					Calculated Reductant Injector coil temperature	>= -6.64 °C		
					Calculated Reductant Injector coil temperature	<= 99.96 °C		
					)			
					(			
					battery voltage	>= 11 V		
					battery voltage	<= 655.34 V		
					)			
					(			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Reductant Dosing System pump relative pressure	>= 350 kPa		
					Reductant Dosing System pump relative pressure	<= 650 kPa		
					)			
					(			
					ambient pressure	>= 0 kPa		
					ambient pressure	<= 130 kPa		
					)			
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					)			
					(			
					ambient pressure	> 0 kPa		
					ambient temperature	> -30.04 °C		
					)			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage	P2033	Detects high voltage readings on the EGT 2 circuit, indicating an OOR high condition on the EGT 2 circuit	temperature sensor voltage downstream of oxidation catalyst	> 2.2066 V	ignition on	= TRUE -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	A
			same as		and			
			temperature downstream of oxidation catalyst	> 1000 °C	basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	P2032	Detects low voltage readings on the EGT 2 circuit, indicating an OOR low condition on the EGT 2 circuit	temperature sensor voltage downstream of oxidation catalyst	<	0.6544	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as				and					
			temperature downstream of oxidation catalyst	<	- 50	°C	basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 1 Performance	P203B	Reductant level plausibility check error from CAN	CAN message: Reductant Level Plausibility Check Error from Reductant tank level evaluation module	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			which means				basic enable conditions met:	=	see sheet enable tables	-		
			(									
			measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied	=	0.0 to 1.7	V						
			measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied	=	1.71 to 3.56	V						
			)									
			or									
			(									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied	= 0.0 to 1.7 V				
			measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied	= 1.71 to 3.56 V				
			)					
			or					
			(					
			measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied	= 0.0 to 1.7 V				
			measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied	= 1.71 to 3.56 V				
Reductant Injector Control Circuit	P2047	Detects an open circuit or an overtemperature condition in the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((		fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					ECU Initialization tasks in progress	= FALSE -		
					)			
					OR			
					(			
					ECU Initialization tasks in progress	= TRUE -		
					((			
					Battery voltage	> 10.5 V		
					for time	> 3 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector Control Circuit Low Voltage	P2048	Detects a short circuit to ground in the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((				fail conditions exists for 2 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					ECU Initialization tasks in progress	=	FALSE	-		
					)					
					OR					
					(					
					ECU Initialization tasks in progress	=	TRUE	-		
					((					
					Battery voltage	>	10.5	V		
					for time	>	3	sec		
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Injector Control Circuit High Voltage	P2049	Detects a short circuit to battery in the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				((				fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
							ECU Initialization tasks in progress	=	FALSE	-		
							)					
							OR					
							(					
							ECU Initialization tasks in progress	=	TRUE	-		
							((					
							Battery voltage	>	10.5	V		
							for time	>	3	sec		
							OR					
							Battery voltage	>	11	V		
							)					
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Pressure Sensor Performance	P204B	pressure difference between baro pressure and unfiltered Reductant pressure	Unfiltered Reductant Pump Module Pressure	>	50	kPa	Reductant filling state in the pressure line	<=	0	%	fail conditions exists for more than 0.6 sec monitor runs with 0.01 s rate whenever enable conditions are met	A
							status of SCR control state (please see the definition)	=	No Pressure Control	-		
							State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							ambient pressure	>	0	kPa		
							ambient temperature	>	-30.04	°C		
							NO Pending or Confirmed DTCs:	=	see inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Pressure Sensor Circuit Low	P204C	Measured reductant pump pressure sensor signal low voltage	Reductant pump pressure sensor signal	<	0.41	V	ignition on	=	TRUE	-	fail conditions exists for more than 0.4 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as:				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			reductant pump pressure	<	0	kPa	basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Pressure Sensor Circuit High	P204D	Measured reductant pump pressure sensor signal high voltage	Reductant pump pressure sensor signal	>	4.8	V	ignition on	=	TRUE	-	fail conditions exists for more than 0.4 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as:				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			reductant pump pressure	>	800	kPa	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant System Performance Bank 1	P204F	Unsuccessful reductant pressure build up	Reductant Pump Module Pressure	<	350	kPa	status of SCR control sub state (please see the definition)	=	PRESSU RE BUILDUP	-	fail conditions exists for more than 1 event monitor runs with 0.1 s rate whenever enable conditions are met	A
							(					
							Reductant Defrost check (please see the definition)	=	TRUE	-		
							)					
							ambient pressure	>	0	kPa		
							ambient temperature	>	-30.04	°C		
							number of pressure build up attempts	>=	3	counts		
							(					
							system pressurizes in pressure buildup and ventilation states	>	10	counts		
							Dwell time in Pressure Build up substate	>=	10	sec		
							)					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Tank Temperature Sensor Performance	P205B	Path 1:									fail conditions exists for more than 0.5 sec monitor runs with 0.1 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		The temperature difference between reductant tank temperature and diesel fuel temperature are compared to an upper threshold after sufficient engine-off duration	(a) - (b)	>	34.96	°C	ignition on	=	TRUE	-		
			where				status of SCR control state (please see the definition)	=	No Pressure control	-		
			(a) Reductant tank temperature	=	measured parameter	-	Engine off Time	>	28800	sec		
			(b) fuel temperature	=	measured parameter	-	time since start	>	6	sec		
							Max [(a), (b), (c)] - Min [(a), (b), (c)] where	<=	6.96	°C		
							(a) Oxidation Catalyst upstream temperature	=	measured parameter	-		
							(b) fuel temperature	=	measured parameter	-		
							(c) Particulate filter downstream temperature	=	measured parameter	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
						\		
		Path 2:					fail conditions exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	
		OR			ignition on	= TRUE -		
		The temperature difference between reductant tank temperature and diesel fuel temperature are compared to a lower threshold after sufficient engine-off duration	(a) - (b)	< -35.04 °C	status of SCR control state (please see the definition)	= No Pressure control -		
			where		Engine off Time	> 28800 sec		
			(a) Reductant tank temperature	= measured parameter -	time since start	> 6 sec		
			(b) fuel temperature	= measured parameter -	Max [(a), (b), (c)] - Min [(a), (b), (c)]	<= 6.96 °C		
					where			
					(a) Oxidation Catalyst upstream temperature	= measured parameter -		
					(b) fuel temperature	= measured parameter -		
					(c) Particulate filter downstream temperature	= measured parameter -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
Reductant Tank Temperature Sensor Circuit High	P205C	Detects an out of range low reading of the Reductant Tank Temperature Sensor via CAN Message	Raw value of the CAN message for the Reductant Tank Temperature	< 1 hex	basic enable conditions met:	= see sheet enable tables -	fault exists for more than 3 seconds; monitor runs at 1 s whenever enable conditions are met	A
			Corresponds to a temperature of	<= -55.0 °C	and			
			Corresponds to a resistance of	>= 1200 kOhm	No rolling count or protection value errors. (sliding window errors) in the CAN frame	= TRUE -		
			Corresponds to a voltage of	>= 5.0 V				
Reductant Tank Temperature Sensor Circuit High	P205D	Detects an out of range high reading of the Reductant Tank Temperature Sensor via CAN Message or an invalid (initialization) value of the Reductant Tank Temperature CAN message	Raw value of the CAN message for the Reductant Tank Temperature	> 1022 hex	basic enable conditions met:	= see sheet enable tables -	fault exists for more than 6 seconds; monitor runs at 1 s whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Corresponds to a temperature of	>=	160.0	°C						
			Corresponds to a resistance of	<=	0.153	kOhm						
			Corresponds to a voltage of	<=	0.270	V						
			or				No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	TRUE	-		
			Path2:									
			Raw value of the CAN message for the Reductant Tank Temperature	=	0x3FF	hex						
Exhaust Temperature Sensor 1 Performance	P2080	Detects a fault in the exhaust temperature sensor 1 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 1	<	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE		fail conditions exists for 5s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or				for					
			integrated heat quantity of exhaust gas temperature sensor 1	>	(a) / (b) * (c) / (d) * (e) * (g)	-	time	>	1500	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327	sec		
			and with				and					
			(b) factor		3.600	g/s	(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and with				exhaust-gas temperature sensor 1	>	-60.04	°C		
			(c) heat capacity	=	1050	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 1	<	1999.96	°C		
			(d) factor	=	1000	kW/°C	)					
			and with				and					
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 1	=	1	factor	change in exhaust-gas temperature sensor 1	<	7	K		
							for					
			and with				time	=	5	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 1	=	-100	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #31)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 1	=	100	°C	for					
							time	>=	0.050	sec		
							and					
							change in modeled exhaust-gas temperature sensor 1	>	4	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 1	>	10	kJ		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							heat quantity for exhaust gas temperature sensor 1	<	12	kJ		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Temperature Sensor 2 Performance	P2084	Detects a fault in the exhaust temperature sensor 2 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 2	<	(a) / (b) * (c) / (d) * (e) * (f)		exhaust gas system regeneration mode	=	FALSE		fail conditions exists for 5s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or				for					
			integrated heat quantity of exhaust gas temperature sensor 2	>	(a) / (b) * (c) / (d) * (e) * (g)		time	>	1500	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327	sec		
			and with				and					
			(b) factor	=	3.600	g/s	(					
			and with				exhaust-gas temperature sensor 2	>	-60.04	°C		
			(c) heat capacity	=	1050	J/Kg/°C	and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and with				exhaust-gas temperature sensor 2	<	1999.96	°C		
			(d) factor	=	1000	kW/°C	)					
			and with				and					
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 2	=	1	factor	change in exhaust-gas temperature sensor 2	<	7	K		
							for					
			and with				time	=	5	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 2	=	-100	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #31)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 2	=	100	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 2	>	4	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 2	>	10	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 2	<	12	kJ		
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Exhaust Temperature Sensor 3 Performance	P242B	Detects a fault in the exhaust temperature sensor 3 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 3	< (a) / (b) * (c) / (d) * (e) * (f)	exhaust gas system regeneration mode	= FALSE	fail conditions exists for 5s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or		for			
			integrated heat quantity of exhaust gas temperature sensor 3	> (a) / (b) * (c) / (d) * (e) * (g)	time	> 1500 sec		
			with		and			
			(a) exhaust gas mass flow	= calculated parameter -	time since start	> 327 sec		
			and with		and			
			(b) factor	= 3.600 g/s	(			
			and with		exhaust-gas temperature sensor 3	> -60.04 °C		
			(c) heat capacity	= 1050 J/Kg/°C	and			
			and with		exhaust-gas temperature sensor 3	< 1999.96 °C		
			(d) factor	= 1000 kW/°C	)			
			and with		and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 3	= 1 factor	change in exhaust-gas temperature sensor 3	< 7 K		
					for			
			and with		time	= 5 sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 3	= -100 °C	and			
			and with		engine operation point suitable for diagnostic (see Look-Up-Table #31)	= 0 to 255 -		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	= 100 °C	for			
					time	>= 0.05 sec		
					and			
					change in modeled exhaust-gas temperature sensor 3	> 4 K		
					and			
					(			
					heat quantity for exhaust gas temperature sensor 3	> 10 kJ		
					and			
					heat quantity for exhaust gas temperature sensor 3	< 12 kJ		
					)			
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Exhaust Temperature Sensor 4 Performance	P246F	Detects a fault in the exhaust temperature sensor 4 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 4	< (a) / (b) * (c) / (d) * (e) * (f)	exhaust gas system regeneration mode	= FALSE	fail conditions exists for 5s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or		for			
			integrated heat quantity of exhaust gas temperature sensor 4	> (a) / (b) * (c) / (d) * (e) * (g)	time	> 1500 sec		
			with		and			
			(a) exhaust gas mass flow	= calculated parameter -	time since start	> 327 sec		
			and with		and			
			(b) factor	= 4.600 g/s	(			
			and with		exhaust-gas temperature sensor 4	> -60.04 °C		
			(c) heat capacity	= 1050 J/Kg/°C	and			
			and with		exhaust-gas temperature sensor 4	< 1999.96 °C		
			(d) factor	= 1000 kW/°C	)			
			and with		and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 4	=	1	factor	change in exhaust-gas temperature sensor 4	<	7	K		
							for					
			and with				time	=	5	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 4	=	-100	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #31)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 4	=	100	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 4	>	4	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 4	>	10	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 4	<	12	kJ		
							)					
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump Performance	P208B	The ECM detects that the commanded state of the Reductant Pump driver and the actual state of the control circuit do not match.	timer for functional acknowledgement of the reductant pump motor	>	4	sec	(				fault exists for more than 0.3 s; monitor runs at 0.1 s whenever enable conditions are met	B
			timer for functional acknowledgement of the reductant pump motor	<=	6	sec	Reductant Pump Warm-up status	=	FALSE	-		
							where the Warm-up state is defined as:					
							(					
							No Pressure control state (please see the definition)	=	TRUE	-		
							SCR Engine State (please see the definition)	=	ON	-		
							((					
							Remaining defrosting time of the tank	>	0	sec		
							Remaining defrosting time of the tank	<=	120	sec		
							)					
							OR					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Reductant Defrost check (please see the definition)	=	TRUE	-		
					))					
					ambient temperature	>	-6.64	°C		
					)					
					basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Control Circuit	P208A	Detects an open circuit or an overtemperature condition in the Reductant Pump Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((				fail conditions exists for 6.2 s monitor runs with 0.010 s rate whenever enable conditions are met	B
					Battery voltage	<	10.5	V		
					for time	<	3	sec		
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					((					
					SCR system waiting for shut down in afterrun	=	TRUE	-		
					OR					
					SCR system in standby in afterun	=	TRUE	-		
					)					
					ignition	=	FALSE	-		
					)					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
Reductant Pump Control Circuit High Voltage	P208D	Detects a short circuit to battery in the Reductant Pump Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((Battery voltage for time OR Battery voltage)) and NO Pending or Confirmed DTCs basic enable conditions met:	 < 10.5 V < 3 sec > 11 V = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
Reductant Purge Valve Control Circuit	P20A0	Detects an open circuit in the Reductant Purge Valve Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((ECU Initialization tasks in progress) OR	 = FALSE -	fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(					
							ECU Initialization tasks in progress	=	TRUE	-		
							for time	>	1	sec		
							)					
							((					
							Battery voltage	>	10.5	V		
							for time	>	3	sec		
							OR					
							Battery voltage	>	11	V		
							)					
							)					
							and					
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Purge Valve Performance	P20A1	This diagnostic checks the Reductant Purge valve performance during operation by detecting a lack of reduction of reductant pressure	Difference between reductant pump pressure at beginning and end of pressure reduction phase	<	50	kPa	(				fault exists for more than 1 s monitor runs with 0.100 s rate whenever enable conditions are met	A
							Reductant Dosing System state pressure reduction	=	TRUE	-		
							Reductant Dosing System pump relative pressure to initiate test	>=	350	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					AND					
					((					
					Time attempting to reduce dosing pressure	>=	5	sec		
					AND					
					Reductant Dosing System pump relative pressure after attempting to reduce pressure	>	50	kPa		
					)					
					OR					
					Reductant Dosing System pump relative pressure after attempting to reduce pressure	<=	50	kPa		
					)					
					(					
					ambient pressure	>	0	kPa		
					ambient temperature	>	-100.04	°C		
					)					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Purge Valve Control Circuit Low Voltage	P20A2	Detects a short circuit to ground on the Reductant Purge Valve Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((				fail conditions exists for 2 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					ECU Initialization tasks in progress	=	FALSE	-		
					)					
					OR					
					(					
					ECU Initialization tasks in progress	=	TRUE	-		
					for time	>	1	sec		
					)					
					((					
					Battery voltage	>	10.5	V		
					for time	>	3	sec		
					OR					
					Battery voltage	>	11	V		
					)					
					)					
					and					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters				Enable Conditions	Time Required	MIL Illum.
Reductant Purge Valve Control Circuit High Voltage	P20A3	Detects a short circuit to battery on the Reductant Purge Valve Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		((					fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	A
					ECU Initialization tasks in progress	=	FALSE	-			
					)						
					OR						
					(						
					ECU Initialization tasks in progress	=	TRUE	-			
					for time	>	1	sec			
					)						
					((						
					Battery voltage	>	10.5	V			
					for time	>	3	sec			
					OR						
					Battery voltage	>	11	V			
					)						
					)						
					and						
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-			
					basic enable conditions met:	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Heater 1 Performance	P20BA	Reductant tank temperature is used to verify heating has occurred	temperature difference of current Reductant temperature and start temperature at beginning of the monitoring cycle				((				fault exists for more than 1 event; monitor runs at 0.01 s once per trip whenever enable conditions are met	B
			(a) - (b)	<	0.56	°C	Reductant tank heating active	=	TRUE	-		
			where				for time	>	0	sec		
			(a) filtered current tank temperature	=	measured parameter	-	)					
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured parameter	-	Remaining measured quantity of reducing agent in [%]	>=	62.66	%		
							(					
							filtered current tank temperature	<	-16.04	°C		
							)					
							(					
							Vehicle speed	>=	3.11	mph		
							for time	>	1	sec		
							)					
							(					
							for time since ignition on	>	60	sec		
							)					
							(					
							time counter for activation of tank heater (see Look-Up-Table #86)	>=	1000 to 32767	sec		
							)					
							(					
							ice detection by tank temperature difference:					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(a) - (b)	<=	-0.14	°C		
					(a) filtered current tank temperature	=	measured parameter	-		
					(b) tank temperature captured at the beginning of current monitoring cycle)	=	measured parameter	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					basic enable conditions met	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector Control Circuit	P20CB	Electronic out-put driver circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time	>	3	sec		
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector Performance	P20CC	Detects high exhaust temperatures in order to protect the engine	oxidation catalyst downstream temperature - oxidation catalyst upstream temperature	>	300	°C	(				fail conditions exists for 180 s test performed continuously 0.1 s rate	A
			OR				oxidation catalyst upstream temperature change	<	50	°C		
			particulate filter downstream temperature - SCR downstream temperature	>	300	°C	for time	>	10	sec		
							)					
							AND					
							(					
							time since last successful regeneration	>	900	sec		
							)					
							AND					
							((					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
					OR					
					Exhaust Gas Temperature (Active) Management Mode	=	TRUE	-		
					)					
					for time	>	300	sec		
					)					
					AND					
					(					
					time since the end of the last tip cleaning request of the Exhaust Aftertreatment Fuel Injector	>	300	sec		
					)					
					AND					
					basic enable conditions met:	=	see sheet enable tables	-		
					AND					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage	P20CD	Electronic out-put driver circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 3.0 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
			)							

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	P20CE	Detects high voltage readings on the diesel dosing valve low side powerstage, indicating an OOR high condition on the diesel dosing valve powerstage	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 3.0 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1	sec		
					and					
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P20E2	Detects biased exhaust temperature sensors by comparing the upstream and downstream oxidation catalyst temperature sensors after a calibrated engine off soak time	**Path 1:**				minimum engine-off time	>=	28800	sec	fail conditions exists for 0.050 s monitor runs with 0.050 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #32)	>	100 to 999	°C	and					
			with				ambient temperature	>	-60.04	°C		
			(a) captured oxidation catalyst downstream temperature at start	=	measured parameter	-	and					
			and with				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	=	measured parameter	-	for					
			or				time	>	0	sec		
			Path 2:				and					
			(				engine post drive/ afterun	=	FALSE	-		
			|(a) - (b)| (see Look-Up-Table #32)	<=	100 to 999	°C	and					
			with				diagnostic performed in current dc	=	FALSE	-		
			(a) captured oxidation catalyst downstream temperature at start	=	measured parameter	-	and					
			and with				basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	= measured parameter -	and			
			and		NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			|(a) - (b)| (see Look-Up-Table #33)	> 30 to 999 °C				
			with					
			(a) captured oxidation catalyst downstream temperature at start	= measured parameter -				
			and with					
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	= measured parameter -				
			and					
			status of block heater	= FALSE				
Reductant Pressure too Low	P20E8	Compare Reductant tank pressure with lower thresholds under metering control	Reductant Pump Module Pressure	< 400 kPa	status of SCR control sub state (please see the definition)	= Metering control -	fail conditions exists for more than 60.0 s monitor runs with 0.1 s rate whenever enable conditions are met	A
					status byte in substate METERING CONTROL	= Running		
					Dwell time in Metering control substate	> 1 sec		
					ambient pressure	>= 0 kPa		
					ambient temperature	>= -30.04 °C		
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pressure too High	P20E9	**Path 1:** Compare Reductant tank pressure with upper threshold under metering control	Reductant Pump Module Pressure	>	650	kPa	status of SCR control sub state (please see the definition)	=	Metering control	-	fail conditions exists for more than 10 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							status byte in substate METERING CONTROL	=	Running	-		
							Dwell time in Metering control substate	>	1	sec		
							ambient pressure	>=	0	kPa		
							ambient temperature	>=	-30.04	°C		
							NO Pending or Confirmed DTCs:	=	see inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Path 2: Or Reductant tank pressure high	Unfiltered Reductant Pump Module Pressure	>	795	kPa	ambient pressure	>	0	kPa	fail conditions exists for more than 1 s monitor runs with 0.1 s rate whenever enable conditions are met	
							ambient temperature	>	-30.04	°C		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
SCR Nox Catalyst Efficiency Below Threshold Bank 1	P20EE	Compare EWMA filtered NOx conversion efficiency of SCR catalyst with a threshold value	EWMA filtered delta SCR catalyst efficiency of (a) - (b)	<	0	factor	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for more than 1 event monitor runs with 0.01 s rate whenever enable conditions are met	A
			where				for time	>	300	sec		
			(a) measured SCR catalyst efficiency	=	calculated parameter	-						
			(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	=	calculated parameter	-	Status of NOx signal of upstream NOx sensor (please see the definition)	=	Active	-		
							for time	>	60	sec		
							Status of NOx signal of downstream NOx sensor (please see the definition)	=	Active	-		
							for time	>	60	sec		
							(					
							Release of dosing strategy (please see the definition)	=	TRUE	-		
							for time	>=	(a) + (b)	sec		
							(a) Turn on delay time 1 of status metering strategy	=	330	sec		
							(b) Turn on delay time 2 of status metering strategy	=	20	sec		
							)					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Status for disabling SCR Efficiency monitoring following an SCR Adaptation completion (please see the definition)	=	FALSE	-		
					for time	>	(a) + (b)	sec		
					(a) Debounce time after pre controlled dosing over	>	0.5	sec		
					(b) delay time the status of disabling SCR Efficiency monitoring	>	80	sec		
					or					
					integrated upstream NOx	>=	0	g		
					)					
					(					
					Status of pre controlled dosing (please see the definition)	=	FALSE	-		
					for time	>	(a) + (b)			
					(a) Debounce time after pre controlled dosing off	=	0.5	sec		
					(b) Delay time after pre controlled dosing off	=	180	sec		
					or					
					integrated upstream NOx	>=	0	g		
					)					
					(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Decrease of Reductant load level (please see the definition)	=	FALSE	-		
					for time	>	200	sec		
					)					
					(					
					Average slow filtered NOx mass flow upstream SCR	<=	0.20	g/sec		
					for time	>	0.5	sec		
					Monitor disable time based on average NOx mass flow and the time (see Look-Up-Table #85)	>	0 to 120	sec		
					)					
					following conditions for time:	>	15	sec		
					((					
					Delta SCR temperature (see Look-Up-Table #84)	<=	29.96 to 59.96	°C		
					or					
					Delta SCR temperature	>	524.96	°C		
					Delta SCR temperature	<	199.96	°C		
					or					
					Initialization time of temperature gradient calculation	<	2.5	sec		
					)					
					or					
					Delta SCR temperature	<	229.96	°C		
					or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Delta SCR temperature	>	499.96	°C		
					for time	>	10	sec		
					)					
					(					
					HC load in SCR catalyst	<=	0.76	-		
					or					
					HC load in SCR catalyst	>	0.76	-		
					PM Filter Regeneration	=	TRUE	-		
					)					
					(					
					ambient pressure	>=	74.8	kPa		
					ambient temperature	>=	-7.04	°C		
					)					
					(					
					Stuck reductant dosing valve fault was healed	=	FALSE	-		
					last particulate filter regeneration successful	=	TRUE	-		
					)					
					(					
					State of the NH3 slip detection	=	FALSE	-		
					integrated upstream NOx during SCR adaptation plausibility check active	>=	20	g		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	600	sec		
					)					
					SCR NOx Catalyst Efficiency Below Threshold Bank 1 was performed this drive cycle	=	FALSE	-		
					(					
					engine speed	>=	1000	rpm		
					engine speed	<=	3000	rpm		
					for time	>	0	sec		
					)					
					SCR estimated current Reductant load (see Look-Up-Table #75)	>=	0.1 to 1.69	g		
					SCR estimated current Reductant load (see Look-Up-Table #73)	<=	0.3 to 1.85	g		
					Release of efficiency monitoring with active adaptation but without Reductant slip (please see the definition)	=	TRUE	-		
					)					
					with					
					Enable Reductant Quality check delay	=	TRUE	-		
					(					
					(a) - (b)	<=	99.96	°C		
					for time	>	0	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					or			
					(a) - (b)	>= -0.04 °C		
					for time	> 0 sec		
					(a) upstream SCR catalyst temperature (b) downstream SCR catalyst temperature)			
					(			
					Difference between nominal and estimated Reductant (see Look-Up-Table #77)	<= 0.05 to 0.2 g		
					Difference between nominal and estimated Reductant	>= -0.5 g		
					Status of pre controlled dosing (please see the definition)	= FALSE -		
					for time	> 0 sec		
					Integrated NOx mass upstream SCR	> 1.25 g		
					for time	> 1 sec		
					Downstream SCR catalyst temperature	>= 289.96 °C		
					Downstream SCR catalyst temperature	<= 209.96 °C		
					Filtered and delayed upstream NOx raw emission	>= 750 ppm		
					Filtered and delayed upstream NOx raw emission	<= 175 ppm		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	<= 0.170 g/sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Filtered and delayed NOx raw emission mass flow upstream of SCR	>=	0.02	g/sec		
					Filtered exhaust gas mass flow	<=	152.78	g/sec		
					Filtered exhaust gas mass flow	>=	69.44	g/sec		
					MAP for valid engine operation points for SCR efficiency monitoring (1 = Active) (see Look-Up-Table #82)	=	0 to 1	factor		
					for time	>	0	sec		
					Inverse calculated accelerator pedal value	>	2.00	%		
					for time	>	0	sec		
					EWMA Operation					
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.4	factor		
					number of SCR efficiency measurements for fast initialization mode	>=	2	count		
					EWMA Rapid Response mode:					
					EWMA filtered delta SCR catalyst efficiency	>	0.15	factor		
					(a) - (b)	<	0.01	factor		
					(a) measured SCR catalyst efficiency					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)					
					offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	>	0	factor		
					filter coefficient for Rapid Response mode	=	0.15	factor		
					number of SCR efficiency measurements for Rapid Response mode	>=	6	count		
					EWMA filtered value too small in Fast Init. And Rapid Response modes:					
					EWMA filtered delta SCR catalyst efficiency of (a) - (b)	<	0	factor		
					(a) measured SCR catalyst efficiency					
					(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)					
					EWMA stabilized mode:					
					filter coefficient for stabilized mode	=	0.1	factor		
					number of SCR efficiency measurements for stabilized mode	=	1	count		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Nox Concentration High - Unknown Reason	P2BAD	Compare EWMA filtered NOx conversion efficiency of SCR catalyst with a threshold value	EWMA filtered delta SCR catalyst efficiency of (a) - (b)	<	0	factor	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for more than 1 event monitor runs with 0.01 s rate whenever enable conditions are met	A
			where				for time	>	300	sec		
			(a) measured SCR catalyst efficiency	=	calculated parameter	-						
			(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	=	calculated parameter	-	Status of NOx signal of upstream NOx sensor (please see the definition)	=	Active	-		
							for time	>	60	sec		
							Status of NOx signal of downstream NOx sensor (please see the definition)	=	Active	-		
							for time	>	60	sec		
							(					
							Release of dosing strategy (please see the definition)	=	TRUE	-		
							for time	>=	(a) + (b)	sec		
							(a) Turn on delay time 1 of status metering strategy		330	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) Turn on delay time 2 of status metering strategy		20	sec		
					)					
					(					
					Status for disabling SCR Efficiency monitoring following an SCR Adaptation completion (please see the definition)	=	FALSE	-		
					for time	>	(a) + (b)	sec		
					(a) Debounce time after pre controlled dosing over	>	0.5	sec		
					(b) delay time the status of disabling SCR Efficiency monitoring	>	80	sec		
					or					
					integrated upstream NOx	>=	0	g		
					)					
					(					
					Status of pre controlled dosing (please see the definition)	=	FALSE	-		
					for time	>	(a) + (b)			
					(a) Debounce time after pre controlled dosing off	=	0.5	sec		
					(b) Delay time after pre controlled dosing off	=	180	sec		
					or					
					integrated upstream NOx	>=	0	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					(					
					Decrease of Reductant load level (please see the definition)	=	FALSE	-		
					for time	>	200	sec		
					)					
					(					
					Average slow filtered NOx mass flow upstream SCR	<=	0.200	g/sec		
					for time	>	0.5	sec		
					Monitor disable time based on average NOx mass flow and the time (see Look-Up-Table #85)	>	0 to 120	sec		
					)					
					for time with	>	15	sec		
					((					
					Delta SCR temperature (see Look-Up-Table #84)	<=	29.96 to 59.96	°C		
					or					
					Delta SCR temperature	>	524.96	°C		
					Delta SCR temperature	<	199.96	°C		
					or					
					Initialization time of temperature gradient calculation	<	2.5	sec		
					)					
					or					
					Delta SCR temperature	<	229.96	°C		
					or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Delta SCR temperature	>	499.96	°C		
					for time		10	sec		
					)					
					(					
					HC load in SCR catalyst	<=	0.76	-		
					or					
					HC load in SCR catalyst	>	0.76	-		
					PM Filter Regeneration	=	TRUE	-		
					)					
					(					
					ambient pressure	>=	74.8	kPa		
					ambient temperature	>=	-7.04	°C		
					)					
					(					
					Active operation mode	≠	0	sec		
					for time	>	0	sec		
					exhaust gas mass flow change per second	>=	-327.68	g/sec/sec		
					exhaust gas mass flow change per second	<=	327.67	g/sec/sec		
					for time	>	0	sec		
					Upstream NOx mass flow change per second	>=	-0.32768	g/sec/sec		
					Upstream NOx mass flow change per second	<=	0.3267	g/sec/sec		
					for time	>	0	sec		
					Stuck reductant dosing valve fault was healed	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					last particulate filter regeneration successful	=	TRUE	-		
					)					
					(					
					State of the NH3 slip detection	=	FALSE	-		
					integrated upstream NOx during SCR adaptation plausibility check active	>=	20	g		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					for time	>	600	sec		
					)					
					Reductant Delivery performance completed this drive cycle	=	FALSE	-		
					(					
					engine speed	>=	1000	rpm		
					engine speed	<=	3000	rpm		
					for time	>	0	sec		
					)					
					SCR estimated current Reductant load (see Look-Up-Table #75)	>=	0.1 to 1.69	g		
					SCR estimated current Reductant load (see Look-Up-Table #73)	<=	0.3 to 1.85	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Release of efficiency monitoring with active adaptation but without Reductant slip (please see the definition)	=	TRUE	-		
					)					
					with					
					Enable Reductant Quality check delay	=	TRUE	-		
					(					
					(a) - (b)	<=	99.96	°C		
					for time	>	0	sec		
					or					
					(a) - (b)	>=	-0.04	°C		
					for time	>	0	sec		
					(a) upstream SCR catalyst temperature	=	measured parameter	-		
					(b) downstream SCR catalyst temperature	=	measured parameter	-		
					)					
					(					
					Difference between nominal and estimated Reductant (see Look-Up-Table #77)	<=	0.05 to 0.2	g		
					Difference between nominal and estimated Reductant	>=	-0.5	g		
					Status of pre controlled dosing (please see the definition)	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	0	sec		
					)					
					Integrated NOx mass upstream SCR	>	1.25	g		
					for time	>	1	sec		
					Downstream SCR catalyst temperature	>=	289.96	°C		
					Downstream SCR catalyst temperature	<=	209.96	°C		
					Filtered and delayed upstream NOx raw emission	<=	750	ppm		
					Filtered and delayed upstream NOx raw emission	>=	175	ppm		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	<=	0.170	g/sec		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	>=	0.02	g/sec		
					Filtered exhaust gas mass flow	<=	152.78	g/sec		
					Filtered exhaust gas mass flow	>=	69.44	g/sec		
					MAP for valid engine operation points for SCR efficiency monitoring (see Look-Up-Table #82)	=	0 to 1	factor		
					for time	>	0	sec		
					Inverse calculated accelerator pedal value	>	2.00	%		
					for time	>	0	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Accelerator Pedal Position (APP) Sensor 1 Circuit Low Voltage	P2122	Detects low voltage readings on the APP circuit, indicating an OOR low condition on the APP 1 circuit	voltage of acceleration pedal sensor 1	<=	0.785	V	ignition on	=	TRUE	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as				and					
			acceleration pedal position	<=	-3.3	%	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Accelerator Pedal Position (APP) Sensor 1 Circuit High Voltage	P2123	Detects high voltage readings on the APP circuit, indicating an OOR high condition on the APP 1 circuit	voltage of acceleration pedal sensor 1	>=	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as				and					
			acceleration pedal position	>=	103.3	%	basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Accelerator Pedal Position (APP) Sensor 2 Circuit Low Voltage	P2127	Detects low voltage readings on the APP circuit, indicating an OOR low condition on the APP 2 circuit	voltage of acceleration pedal sensor 2	<= 0.308 V	ignition on	= TRUE -	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as		and			
			acceleration pedal position	<= -6.6 %	basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P2128	Detects high voltage readings on the APP circuit, indicating an OOR high condition on the APP 2 circuit	voltage of acceleration pedal sensor 2	>= 2.315 V	ignition on	= TRUE -	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as		and			
			acceleration pedal position	>= 106.6 %	basic enable conditions met:	= see sheet enable tables -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects in range pedal positions errors by comparing voltages on each sensor.	|maximum value ((a/b) or (c)) - maximum value ((c) or (d))| (see Look-Up-Table #14)	> 0.12 to 0.18 V	ignition on	= TRUE -	fail conditions exists for 0.2 s monitor runs with 0.01 rate whenever enable conditions are met	A
			with		and			
			(a) voltage of acceleration pedal position sensor 1	= measured parameter -	basic enable conditions met:	= see sheet enable tables -		
			and with		and			
			(b) factor between sensor raw values	= 2 factor	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			and with					
			(c) minimum voltage	= 0.450 V				
			and with					
			(d) redundant voltage of acceleration pedal (from pedal position sensor 2)	= calculated parameter -				
Injector Positive Voltage Control Circuit Group 1	P2146	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #1.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					and			
					fuel system status	= no fuel cut off -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2	P2149	ECM Electronic output driver circuitry determines if faults (open/short/no load) exist on injector charging bank #2.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition) and fuel system status	= =	TRUE no fuel cut off	- -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector Positive Voltage Control Circuit Group 3	P2152	ECM Electronic output driver circuitry determines if faults (open/short/no load) exist on injector charging bank #3.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition) and fuel system status	= =	TRUE no fuel cut off	- -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector Positive Voltage Control Circuit Group 4	P2155	ECM Electronic output driver circuitry determines if faults (open/short/no load) exist on injector charging bank #4.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine Running (see parameter definition) and fuel system status	= =	TRUE no fuel cut off	- -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Level Sensor 1 Circuit Low	P203C	CAN message: Discrete level sensor level 1 short to ground error	Reductant Tank Level 1 Error Status	=	1	-	ignition on	=	TRUE	-	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
			(tank level sensor 1 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 2 Circuit Low	P21AA	CAN message: Discrete level sensor level 2 short to ground error	Reductant Tank Level 2 Error Status	=	1	-	ignition on	=	TRUE	-		
			(tank level sensor 2 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 3 Circuit Low	P21AF	CAN message: Discrete level sensor level 3 short to ground error	Reductant Tank Level 3 Error Status	=	1	-	ignition on	=	TRUE	-		
			(tank level sensor 3 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 2 Circuit High	P21AB	Path 1:									fail conditions exists for more than 3 sec monitor runs with 0.01 s rate whenever enable conditions are met	A
		CAN message: Discrete level sensor 2 open load error	Reductant Tank Level 2 Error Status	=	3	-	ignition on	=	TRUE	-		
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2:										
		CAN message: Discrete level sensor 2 short to battery error	Reductant Tank Level 2 Error Status	=	2	-	ignition on	=	TRUE	-		
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Level Sensor 3 Circuit High	P21B0	Path 1:										
		CAN message: Discrete level sensor 3 open load error	Reductant Tank Level 3 Error Status	=	3	-	ignition on	=	TRUE	-		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2:										
		CAN message: Discrete level sensor 3 short to battery error	Reductant Tank Level 3 Error Status	=	2	-	ignition on	=	TRUE	-		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 1 Circuit High	P203D	Path 1:										

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		CAN message: Discrete level sensor 1 open load error	Reductant Tank Level 1 Error Status	=	3	-	ignition on	=	TRUE	-		
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2:										
		CAN message: Discrete level sensor 1 short to battery error	Reductant Tank Level 1 Error Status	=	2	-	ignition on	=	TRUE	-		
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Circuit Bank 1 Sensor 1	P2200	Detects a failure when open circuit status message from NOx sensor is received continuously for a time period	Open circuit NOx signal error	=	TRUE	-	battery voltage	<=	655.34	V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
							battery voltage	>=	11.0	V		
							SCR upstream temperature	<=	3003.56	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active) consisting of:	= TRUE -		
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
		Detects a failure when open circuit status message from binary lambda sensor is received continuously for a time period	Open circuit binary lambda signal error	= TRUE -	battery voltage	<= 655.34 V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.0 V		
					SCR upstream temperature	<= 3003.56 °C		
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active) consisting of:	= TRUE -		
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
		Detects a failure when open circuit status message from linear lambda sensor is received continuously for a time period	Open circuit linear lambda signal error	= TRUE -	battery voltage	<= 655.34 V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.0 V		
					SCR upstream temperature	<= 3003.56 °C		
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
		Detects a failure when short circuit status message from NOx sensor is received continuously for a time period	Short Circuit Nox signal error	= TRUE -	battery voltage	>= 11.0 V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					SCR upstream temperature	<= 3003.56 °C		
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a failure when short circuit status message from binary lambda sensor is received continuously for a time period	Short Circuit binary lambda signal error	=	TRUE	-	battery voltage	>=	11.0	V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
							SCR upstream temperature	<=	3003.56	°C		
							SCR upstream temperature	>=	94.96	°C		
							no pending or confirmed faults	=	See Sheet Inhibit Table	-		
							Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	=	TRUE	-		
							Time since Quick Ignition Off-On Cycle	>=	20	sec		
							Can Bus Initialized (CAN Bus is Active) consisting of:	=	TRUE	-		
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
		Detects a failure when short circuit status message from linear lambda sensor is received continuously for a time period	Short Circuit linear lambda signal error	=	TRUE	-	battery voltage	>=	11.0	V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
							SCR upstream temperature	<=	3003.56	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active) consisting of:	= TRUE -		
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
N0x Sensor Performance Bank 1 Sensor 1	P2201	If when transitioning from engine load to overrun, the rate at which the NOx concentration falls is slower than a calibrated threshold a fault is set.	Time it takes for the NOx concentration level to fall from 70% to 40% of the initial Nox concentration value	> 2.3 sec	State of the NOx sensor dynamic monitoring state machine	= Evaluate falling edge of NOx concentra tion signal -	fail conditions exist for 1 event, test is performed in the 0.01 s rate when enable conditions are met	B
			or		and			
			Downstream NOx concentration	> 40% of Initial Nox Concentra tion Level	Injection quantity for current cylinder	< 2.0 mm^3 /rev		
			for time	> 5 sec	for time	< 1.05 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
N0x Sensor Circuit High Bank 1 Sensor 1	P2203	Detects an out of range high fault of the upstream NoX Sensor	Nox sensor signal (raw information received via CAN from Nox sensor)	> 2500 ppm	Valid NOx signal from CAN is received (no Nox sensor communication failures)	= TRUE -	fault conditions exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	B
					Engine Running (see parameter definition)	= TRUE -		
					for time	> 20 sec		
					and			
N0x Sensor Circuit Low Bank 1 Sensor 1	P2202	Detects an out of range low fault of the upstream NoX Sensor	Nox sensor signal (raw information received via CAN from Nox sensor)	< -90 ppm	Injection Quantity	> 8 mm^3 /rev		
					Nox sensor 1 ready status (see parameter definition)	= TRUE -		
Nox Sensor Heater Control Circuit Bank 1 Sensor 1	P2205	Detects a failure when open circuit status message from NOx sensor heater is received continuously for a time period	Short Circuit Nox Heater signal error	= TRUE -	battery voltage	>= 11.0 V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
					SCR upstream temperature	<= 3003.56 °C		
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active) consisting of:	= TRUE -		
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
		Detects a failure when short circuit status message from NOx sensor heater is received continuously for a time period	Short Circuit Nox heater lambda signal error	= TRUE -	battery voltage	>= 11.0 V	fail conditions exists for more than 3 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					SCR upstream temperature	<= 3003.56 °C		
					SCR upstream temperature	>= 94.96 °C		
					no pending or confirmed faults	= See Sheet Inhibit Table -		
					Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	= TRUE -		
					Time since Quick Ignition Off-On Cycle	>= 20 sec		
					Can Bus Initialized (CAN Bus is Active) consisting of:	= TRUE -		
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
N0x Heater Performance Bank 1 Sensor 1	P2209	Monitoring of the upstream NoX sensor signal readiness	Upstream Nox sensor readiness condition is not active	= TRUE -	NoX sensor heater diagnosis enabled (dewpoint end is reached)	= TRUE -	fault conditions exists for more than 0.5 s; monitor runs at 0.1 s when enable conditions are met	B
					for time	> 150 sec		
					battery voltage	>= 11.0 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					engine speed	>= 600 rpm		
					engine speed	<= 5000 rpm		
					A delay time required for the NOx sensor to give valid response	> 20 sec		
					Valid NOx signal from CAN is received (no Nox sensor communication failures)	= TRUE -		
					basic enable conditions met:	= see sheet enable tables -		
					No Pending or Confirmed DTC	= see sheet inhibit tables -		
Barometric Pressure (BARO) Circuit Low	P2228	Detects low voltage readings on the ECM internal BARO circuit, indicating an OOR low condition on the BARO circuit.	voltage of barometric pressure sensor	<= 1.9738 V	ignition	= on -	fail conditions exists for 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
			same as		and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			ambient pressure	<=	50	kPa	basic enable conditions met:	=	see sheet enable tables	-		
Barometric Pressure (BARO) Circuit High	P2229	Detects high voltage readings on the ECM internal BARO circuit, indicating an OOR high condition on the BARO circuit.	voltage of barometric pressure sensor	>	4.8	V	ignition	=	on	-	fail conditions exists for 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
			same as				and					
			ambient pressure	>=	120.3	kPa	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Turbo Boost System Performance	P2263	Detects if the Turbocharger is severely over or under boosting based on MAP sensor output	manifold absolute pressure	>	350	kPa	ignition	=	on	-	fail conditions exists for 15 s test performed continuously 0.01 s rate	A
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			manifold absolute pressure (see Look-Up-Table #3)	<	40 to 155	kPa	ignition	=	on	-	fail conditions exists for 15 s test performed continuously 0.01 s rate	
							and					
							actuator position of throttle valve	<=	5	%		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Pressure Regulator 2 Control Circuit	P2294	Electronic out-put driver circuitry determines circuit integrity on the pressure control valve circuit.	Electronic power stage circuitry determines open circuit on the fuel pressure regulator 2 control circuit.		battery voltage	>	11	V	fail conditions exists for 0.75 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for					
					time		3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					ignition on	=	TRUE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
			Electronic power stage circuitry determines over temperature on the fuel pressure regulator 2 control circuit.		battery voltage	>	11	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for					
					time		3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Fuel Pressure Regulator 2 Control Circuit Low Voltage	P2295	Electronic out-put driver circuitry determines circuit integrity on the fuel pressure regulator control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11 V	fail conditions exists for 0.75 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for			
					time	3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Fuel Pressure Regulator 2 Control Circuit High Voltage	P2296	Electronic out-put driver circuitry determines circuit integrity on the fuel pressure regulator control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11 V	fail conditions exists for 0.50 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for			
					time	3 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
NOx Sensor Circuit Bank 1 Sensor 2	P229E	Downstream NOx sensor open circuit error via the CAN message	Open circuit error of downstream NOx sensor via CAN message	= TRUE -	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	= TRUE -	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	A
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Open circuit error of the binary lambda signal of Downstream NOx sensor via the CAN message	Open circuit lambda binary error of downstream NOx sensor via CAN message	=	TRUE	-	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	=	TRUE	-	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	
							basic enable conditions met:	=	see sheet enable tables	-		
		Open circuit error of linear lambda signal of Downstream NOx sensor via the CAN message	Open circuit lambda linear error of downstream NOx sensor via CAN message	=	TRUE	-	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	=	TRUE	-	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Downstream NOx sensor short circuit error via the CAN message	Short circuit NOx signal error of downstream NOx sensor via CAN message	= TRUE -	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	= TRUE -	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	
					basic enable conditions met:	= see sheet enable tables -		
		Short circuit error of binary lambda signal of Downstream NOx sensor via the CAN message	Short circuit lambda binary error of downstream NOx sensor via CAN message	= TRUE -	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	= TRUE -	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Short circuit error of linear lambda signal of Downstream NOx sensor via the CAN message	Short circuit lambda linear error of downstream NOx sensor via CAN message	=	TRUE	-	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	=	TRUE	-	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Performance - Signal Insufficient Peak Value Bank 1 Sensor 2	P229F	Compares Delta NOx concentration of downstream NOx sensor with a threshold	Maximum deviation of downstream NOx concentration from the state machine_5	>=	0	ppm	NO Pending or Confirmed DTCs:	=	See sheet inhibit table	-	fail conditions exists for more than 1 event monitor runs with 0.01s rate whenever enable conditions are met	B
			and				Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE			
							for time	>	0.5	sec		
			Maximum deviation of downstream NOx concentration from the state machine_5	<	Min [(a), [b)]	ppm						
			and with				Status of NOx signal of downstream NOx sensor (please see the definition)	=	TRUE	-		
			(				for time	>	0.5	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) Limit value for Stuck in range check of downstream NOx concentration	=	500	ppm	exhaust gas massflow	>=	2.78	g/sec		
			(b) = (c) * (d)				engine speed	>	100	rpm		
			and with				for time	>	10	sec		
			(				DPF Regeneration inactive	=	TRUE			
			(c) Weighting factor for calculating the peak limit value based on the SCR temperature and the NOx mass flow	=	32.767	factor	Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
			(d) Average upstream NOx concentration	=	measured parameter	ppm	for time	>	120	sec		
			)				State of Reductant injection valve Component Protection (please see definition)	=	FALSE			
							for time	>	120	sec		
							(					
							State machine_0 : starting state and waiting for low upstream NOx mass flow / concentration					
							(					
							Filtered upstream NOx mass flow	<	0.015	g/sec		
							Filtered NOx concentration	<	180	ppm		
							Exhaust mass flow rate	<	69.44	g/sec		
							for time	<	2	sec		
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					State machine_1 : low upstream NOx mass flow /concentration reached					
					(					
					Old State machine_0 : starting state and waiting for low upstream NOx mass flow / concentration	=	TRUE			
					for time	>=	2	sec		
					Filtered upstream NOx mass flow	<	0.015	g/sec		
					Filtered NOx concentration	<	180	ppm		
					Exhaust mass flow rate	<	69.44	g/sec		
					captured minimum downstream NOx concentration in State machine_1	=	Measured parameter	ppm		
					)					
					State machine_2 : start Upstream NOx peak					
					(					
					Old State machine_1 : low upstream NOx mass flow /concentration reached	=	TRUE	-		
					(					
					Filtered upstream NOx mass flow or	>	0.015	g/sec		
					Filtered NOx concentration or	>	180	ppm		
					Exhaust mass flow message	>	69.44	g/sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					for time	< 2 sec		
					Absolute deviation of downstream NOx concentration: | (a) - (b) |	= Measured parameter ppm		
					and with			
					(a) Filtered downstream NOx concentration	= Measured parameter ppm		
					(b) captured minimum downstream NOx concentration in State machine_1	= Measured parameter ppm		
					)			
					State machine_3 : Upstream NOx peak detection			
					(			
					Old State machine_2 : start Upstream NOx peak	= TRUE		
					for time	>= 2 sec		
					Filtered upstream NOx mass flow	>= 0.030 mg/sec		
					Filtered NOx concentration	>= 500 ppm		
					Exhaust mass flow rate	>= 77.78 g/sec		
					for time	> 2 sec		
					Absolute deviation of downstream NOx concentration: | (a) - (b) |	= Measured parameter ppm		
					and with			
					(a) Filtered downstream NOx concentration	= Measured parameter ppm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(b) captured minimum downstream NOx concentration in State machine_1	= Measured parameter ppm		
					)			
					State machine_4 : delay for downstream NOx peak evaluation (			
					Old State machine_3 : Upstream NOx peak detection	= TRUE		
					for time	>= 2 sec		
					Filtered and estimated NOx conversion efficiency of SCR catalyst	<= 0.8 factor		
					Absolute deviation of downstream NOx concentration: | (a) - (b) |	= Measured parameter ppm		
					and with			
					(a) Filtered downstream NOx concentration	= Measured parameter ppm		
					(b) captured minimum downstream NOx concentration in State machine_1	= Measured parameter ppm		
					for time	> 2 sec		
					)			
					State machine_5 : end of downstream NOx peak and evaluation (			
					Old State machine_4 : delay for downstream NOx peak evaluation	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>=	2	sec		
							Maximum deviation of downstream NOx concentration among different states of state machine	=	5	ppm		
							Average SCR catalyst temperature	>	199.96	°C		
							Average upstream NOx mass flow in state machine_3 and _4	>=	0.030	g/sec		
							Average upstream NOx concentration in state machine_3 and _4	>=	500	ppm		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	Detects an out of range high fault of the downstream NoX Sensor	Downstream Nox sensor signal (raw information received via CAN from Nox sensor)	>	2500	ppm	Valid downstream NOx signal from CAN is received (no Nox sensor communication failures)	=	TRUE	-	fault conditions exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	B
							Engine Running (see parameter definition) (see Look-Up-Table #87)	=	600 to 850	rpm		
							for time	>	20	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	Detects an out of range low fault of the downstream NoX Sensor	Downstream Nox sensor signal (raw information received via CAN from Nox sensor)	< -90 ppm	Injection quantity	> 8 mm^3/rev		
					Nox Bank 1 Sensor 2 ready (see parameter definition)	= TRUE -		
NOx Heater Control Circuit Bank 1 Sensor 2	P22A3	Downstream NOx sensor heater open circuit error via the CAN message	Open circuit heater error of downstream NOx sensor via CAN message	= TRUE -	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	= TRUE -	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	A
					basic enable conditions met:	= see sheet enable tables -		
		Downstream NOx sensor heater short circuit error via the CAN message	Short circuit heater error of downstream NOx sensor via CAN message	= TRUE -	Enabling Downstream NOx sensor heater diagnosis (please see the definition)	= TRUE -	fail conditions exists for more than 3 s monitor runs with 0.1 s rate whenever enable conditions are met	
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
N0x Heater Performance Bank 1 Sensor 2	P22A7	Monitoring of the downstream NoX sensor signal readiness	Downstream Nox sensor readiness condition is not active	= TRUE -	NoX sensor heater diagnosis enabled (dewpoint end is reached)	= TRUE -	fault conditions exists for more than 0.5 s; monitor runs at 0.1 s when enable conditions are met	B
					for time	> 150 sec		
					battery voltage	<= 655.34 V		
					battery voltage	>= 11.0 V		
					engine speed	>= 600 rpm		
					engine speed	<= 5000 rpm		
					SCR downstream temperature	<= 3003.56 °C		
					SCR downstream temperature	>= 94.96 °C		
					delay time required for the NOx sensor to give valid response	> 20 sec		
					Valid NOx signal from CAN is received (no Nox sensor communication failures)	= TRUE -		
					basic enable conditions met:	= see sheet enable tables -		
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
Exhaust Gas Recirculation(EGR) Flow Excessive	P2413	Detects insufficient EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the air mass = actual minus desired value (see Look-Up-Table #3)	> (a)*(b) -	(		fail conditions exists for 15 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with		EGR controller is active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(a) minimum controller deviation	= -1.4 g/rev	and			
			(b) environmental correction factor (see Look-Up-Table #12)	= 0.3 to 1 factor	(			
					VGT offset learning is active	= FALSE -		
					and			
					Engine speed	>= 575 rpm		
					and			
					Engine speed	<= 950 rpm		
					and			
					injection quantity	>= 20 mm^3/rev		
					and			
					injection quantity	<= 72 mm^3/rev		
					and			
					throttle position	< 5 %		
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					)			
					for			
					for time	>= 1.5 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas High Temperature	P2428	Detects implausible temperatures in order to protect the engine	Any two of the following four conditions: ((a) and (b)) or ((a) and (c)) or ((a) and (d)) or ((b) and (c)) or ((b) and (d)) or ((c) and (d)) with (a) oxidation catalyst upstream temperature and with (b) oxidation catalyst downstream temperature and with (c) SCR downstream temperature and with (d) particulate filter downstream temperature	 > 799.96 °C > 799.96 °C > 799.96 °C > 799.96 °C	basic enable conditions met: and NO Pending or Confirmed DTCs:	= see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 6 s test performed continuously 0.1 s rate	A
Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P242C	SCR Catalyst downstream temperature low	voltage of SCR catalyst temperature sensor same as SCR Catalyst temperature	< 0.65 V < -50 °C	((engine speed engine speed current injection quantity current injection quantity engine coolant temperature time since engine start	 <= 6000 rpm >= 0 rpm <= 800 mm^3 /rev >= 0 mm^3 /rev > -50.04 °C > 0 sec	fail conditions exists for more than 5.0 sec. monitor runs with 0.1 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							exhaust-gas mass flow downstream of the exhaust manifold	>	0	g/sec		
							)					
							or					
							SCR catalyst temperature	>	-45.04	°C		
							)					
							for time	>	0	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P242D	SCR Catalyst downstream temperature high	voltage of SCR catalyst temperature sensor	>	2.21	V	((				fail conditions exists for more than 5.0 sec. monitor runs with 0.1 s rate whenever enable conditions are met	A
			same as				engine speed	<=	6000	rpm		
			SCR Catalyst temperature	>	1000	°C	engine speed	>=	0	rpm		
							current injection quantity	<=	800	mm^3 /rev		
							current injection quantity	>=	0	mm^3 /rev		
							Coolant engine down stream temperature	>	-50.04	°C		
							time since engine start	>	0	sec		
							exhaust-gas mass flow downstream of the exhaust manifold	>	0	g/s		
							)					
							or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							SCR catalyst temperature)	>	-45.04	°C		
							for time	>	0	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter Differential Pressure Sensor Performance	P2453	Detects in range faults on the DPF differential pressures sensor.	change in differential pressure	<	-1.0	kPa/s	(				fail conditions exists for 3 s test performed continuously 0.1 s rate	B
			or				change in exhaust gas volume flow	>	0.10	m^3/sec^2		
			change in differential pressure	>	1.0	kPa/s	or					
							change in exhaust gas volume flow	<	-0.10	m^3/sec^2		
							)					
							and					
							current exhaust gas volume flow	>	0.10	m^3/sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			Path 1:				Engine State	=	After Run	-	fail conditions exists for 0.5 s monitor runs with 0.1 s rate whenever enable conditions are met	
			differential pressure sensor	>	3.2	kPa	for time	>	35	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2455	Detects high voltage readings on the DPF differential pressure sensor circuit, indicating an OOR high condition on the circuit	voltage of differential pressure sensor	>	4.6664	V	ignition on	=	TRUE	-	fail conditions exists for 3 s test performed continuously 0.020 s rate	B
			same as				and					
			differential pressure	>	91.7	kPa	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2454	Detects low voltage readings on the DPF differential pressure sensor circuit, indicating an OOR low condition on the circuit	voltage of differential pressure sensor	< 0.8342 V	ignition on	= TRUE -	fail conditions exists for 3 s test performed continuously 0.020 s rate	B
			same as		and			
			differential pressure	< -4.2 kPa	basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Exhaust Gas (EGR) Cooler Performance	P2457	Performs a check of the EGR cooler performance by monitoring the EGR efficiency and comparing it to a threshold value	EGR cooler efficiency taking the ratio of the EGR cooler temperature downstream and the EGR cooler temperature upstream	< (a) + (b) -	(		fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			where		(			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a)	= 0.63	engine speed	>=	1100	rpm		
			and		and					
			(b) (see Look-Up-Table #18)	= -0.12 to 0	engine speed	<=	1800	rpm		
					)					
					and					
					(					
					injection quantity	>=	20	mm^3 /rev		
					and					
					injection quantity	<=	240	mm^3 /rev		
					)					
					and					
					(					
					recirculated exhaust-gas mass flow downstream of the EGR cooler	>=	16.67	g/sec		
					and					
					recirculated exhaust-gas mass flow downstream of the EGR cooler	<=	40.28	g/sec		
					)					
					and					
					EGR controller is active and DPF is not in regeneration mode	=	TRUE			
					and					
					(					
					engine temperature	>=	69.96	°C		
					and					
					engine temperature	<=	122.96	°C		
					)					
					and					
					(					
					(a) - (b)	>=	210	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					with			
					(a) filtered temperature upstream of EGR-cooler			
					and with			
					(b) engine temperature			
					)			
					and			
					(			
					actual valve position of exhaust-gas recirculation	>= 10.00 %		
					and			
					)			
					and			
					(			
					control value provided for EGR cooling bypass	<= 5.00 %		
					)			
					and			
					ambient pressure	>= 74.8 kPa		
					and			
					(			
					ambient temperature	>= -7.04 °C		
					and			
					ambient temperature	<= 3003.56 °C		
					)			
					and			
					particulate filter regeneration	= FALSE -		
					and			
					diagnostic performed in current dc	= FALSE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for					
							time	>=	120	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter Regeneration Frequency	P2459	Detects a DPF that is regeneration too frequently by comparing a threshold to a soot model.	soot mass in the particulate filter	>	**minimum of** ((a) * (b) + (c)) + ((d) * (e)) **or** 327.67	g	particulate filter regeneration - transition false to true	=	TRUE	-	fail conditions exists for more than 1 event monitor runs 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) engine out soot mass flow in the exhaust-gas	=	measured parameter	-	last particulate filter regeneration successful	=	TRUE	-		
			and with				or					
			(b) delta time step	=	calculated parameter	-	particulate filter regeneration must have been completed	=	TRUE	-		
			and with				and					
			(c) simulated maximum base soot mass from previous time step	=	measured parameter	-	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and with		and			
			(d) factor for calculation of a soot mass value offset depending on the simulated maximal base soot mass (see Look-Up-Table #51)	= 0 to 531 g	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			and with					
			(e) factor for determination of correction factor for ash in the particulate filter	= 1 factor				
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	P245A	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid. The faults of the output circuit, that are detected with this diagnosis, are an open circuit or an overtemperature of the integrated circuit within the ECM.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(		fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	> 11 V		
					for			
					time	> 3 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3 sec		
					)			
					and			
					starter is active cranking	= FALSE		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for					
					time	>	3	sec		
					and					
					EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE			
					and					
					(					
					open load diagnostics is triggered after offset learning of valve is completed					
					or					
					tested for open load if the valve is jammed indicated by DTC's	=	see sheet inhibit tables	-		
					)					
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 Low Voltage	P245C	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		
					and					
					EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 High Voltage	P245D	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		(				fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
					battery voltage	>	11	V		
					for					
					time	>	3	sec		
					and					
					battery voltage	<	655.34	V		
					for					
					time	>	3	sec		
					)					
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter - Soot Accumulation	P2463	Detects high levels of soot in the DPF as indicated by the soot model.	soot mass in the particulate filter	>	69.6	g	ignition on	=	TRUE	-	fail conditions exists for 30 s test performed continuously 0.1 s rate	A
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Temperature (EGT) Sensor 4 Sensor Circuit Low Voltage	P2470	Detects low voltage readings on the EGT 4 circuit, indicating an OOR low condition on the EGT 4	particulate filter downstream temperature sensor voltage	<	0.6544	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				and					
			particulate filter downstream temperature	<	-60	°C	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	P2471	Detects high voltage readings on the EGT 4 circuit, indicating an OOR high condition on the EGT 4	particulate filter downstream temperature sensor voltage	>	2.2066	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				and					
			particulate filter downstream temperature	>	999.6	°C	basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P2493	Detects a controller deviation in EGR cooling bypass valve. Actual deviation readings are compared to a threshold.	controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value	>	10.00	%	engine coolant temperature	>	-7.04	°C	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			or				and					
			controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value	<	-10.00	%	offset learning of EGR cooling bypass valve actuator active	=	FALSE	-		
							and					
							offset learning in the previous driving cycle was complete	=	TRUE	-		
							and					
							engine speed	>	100	rpm		
							and					
							EGR Cooler Bypass Valve Actuator	=	ACTIVE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
EGR Cooling Bypass Position Sensor Circuit Low Voltage	P2494	Detects low voltage readings on the EGR cooling bypass position circuit, indicating an OOR low condition on the EGR position circuit	voltage of EGR cooling bypass actuator position sensor	<	0.25	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate when enable conditions are met	A
			same as				and					
			EGR cooling bypass actuator position	<	-22.5	%	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
EGR Cooling Bypass Position Sensor Circuit High Voltage	P2495	Detects high voltage readings on the EGR cooling bypass position circuit, indicating an OOR high condition on the EGR position circuit	voltage of EGR cooling bypass actuator position sensor	>	4.8	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate when enable conditions are met	A
			same as				and					
			EGR cooling bypass actuator position	>	114	%	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Closed loop Reductant Injection Control at Limit-Flow too low	P249E	Detects an out of range low of the long term Reductant quantity adaptation factor	long term adaptation factor of Reductant quantity	<	0.41	-	long term adaptation triggered	=	TRUE	-	fault exists for more than 0.1 s; monitor runs at 0.1 s whenever enable conditions are met	B
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Closed loop Reductant Injection Control at Limit-Flow too high	P249D	Detects an out of range low of the long term Reductant quantity adaptation factor	long term adaptation factor of Reductant quantity	>	1.69	-	long term adaptation triggered	=	TRUE	-	fault exists for more than 0.1 s; monitor runs at 0.1 s whenever enable conditions are met	B
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too Low	P24A0	Detects insufficient HCI temperature. Temperature readings are compared to desired temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the HCI temperature controller	>=	0	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #27)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature setpoint for HCI control loop	>	maximum of (a) and (b+c)	-	time	>	180	sec		
			with				and					
			(a) temperature threshold value	=	100	°C	(					
			and with				exhaust gas temperature control is active	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) temperature value for threshold of monitoring	=	0	°C	means					
			and with				(					
			(c) basic temperature threshold value for monitoring	=	100	°C	temperature upstream of the oxidation catalyst	>	229.96	°C		
							and					
							(					
							particulate filter temperature	>	229.96	°C		
							and					
							(					
							particulate filter temperature	<	719.96	°C		
							or					
							particulate filter temperature for activated post injection	<	749.96	°C		
							)					
							)					
							and					
							release status	=	TRUE	-		
							means					
							(					
							vehicle speed	>=	14.9161	mph		
							and					
							vehicle speed	<=	124.3008	mph		
							)					
							and					
							Actual time spent in coastdown mode	<	60	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too High	P24A1	Detects excessive HCI temperature. Actual HCI controller ratio and temperature readings are compared to desired HCI controller ratio and temperature values as an indication of an excessive exhaust gas temperature.	commanded control value of the HCI temperature controller	<=	0.99	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #28)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature setpoint for HCI control loop	<	minimum of (a) and (b+c-(d-e))	-	time	>	180	sec		
			with				and					
			(a)	=	-75	°C	(					
			and with									
			(b) temperature value for threshold of monitoring	=	0	°C	exhaust gas temperature control is active	=	TRUE	-		
			with				means					
			(c) basic temperature threshold value for monitoring		100	°C	(					
			and with				temperature upstream of the oxidation catalyst	>	229.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(d) temperature setpoint for exhaust gas system control loop	=	calculated parameter	-	and					
			and with				(					
			(e) actual temperature for exhaust gas system control loop	=	measured parameter	-	particulate filter temperature	>	229.96	°C		
							and					
							(					
							particulate filter temperature	<	719.96	°C		
							or					
							particulate filter temperature for activated post injection	<	749.96	°C		
							)					
							and					
							release status	=	TRUE	-		
							means					
							(					
							vehicle speed	>=	14.9161	mph		
							and					
							vehicle speed	<=	124.3008	mph		
							)					
							and					
							Actual time spent in coastdown mode	<	60	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
ECM Power Relay Circuit Performance	P2510	Detects stuck power relay that is not responding to ECM commands to power down or a relay that is opening too early in power down. Stuck on is determined by timer values longer than possible if relay opened at end of after run.	counter value out of EEPROM for open the main relay	> 1 counts	ignition on	= TRUE -	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with 0.02 s rate whenever enable conditions are met	B
					and			
					engine pre drive	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable conditions -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Opening too soon is indicated by a lack of EEPROM write at the last after run.	sticky main relay is detected	=	TRUE	-	ignition off	=	TRUE	-	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with 0.02 s rate whenever enable conditions are met	
			means				and					
			time after request to open the main relay	>	1.4	sec	engine pre drive	=	FALSE	-		
							and					
							battery voltage	>	0.5	V		
							and					
							basic enable conditions met:	=	see sheet enable conditions	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Transition Torque Request Signal Message Counter Incorrect	P2544	Detects implausible torque request information received from the TCM	**Path 1:**				ignition on	=	TRUE	-	fail conditions exist for 0.005 s test performed continuously 0.005 s rate	B
			amount of errors in consecutive frames received from TCM with	>=	7	counts	and					
							new message received	=	TRUE	-		
			number of consecutive frames	>	15	counts	and					
			or				basic enable conditions met:	=	see sheet enable tables	-		
			Path 2:				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			number of protection value errors in TCM message	>	15	counts	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Turbocharger Boost Control Position Sensor Circuit Low Voltage	P2564	Detects low voltage readings on the turbo boost control position sensor circuit, indicating an OOR low condition on the circuit	voltage of boost pressure position sensor	<	0.15	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			same as				and					
			boost pressure position	<	3	%	basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost Control Position Sensor Circuit High Voltage	P2565	Detects high voltage readings on the turbo boost control position sensor circuit, indicating an OOR high condition on the circuit	voltage of boost pressure position sensor	>	4.750	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			same as				and					
			boost pressure position	>	95	%	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	P2598	Detects in range Turbo vane position errors by comparing desired vane position to actual vane position	turbo charger control deviation calculated out of difference between desired and actual value	> 15.00 %	engine speed	>= 300 rpm	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
					and			
					engine speed (see Look-Up-Table #87)	> 600 to 850 rpm		
					for			
Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	P2599	Detects in range Turbo vane position errors by comparing desired vane position to actual vane position	turbo charger control deviation calculated out of difference between desired and actual value	< -15.00 %	time (see Look-Up-Table #88)	> 30 to 327.67 sec		
					and			
					(			
					engine coolant temperature	>= 69.96 °C		
					and			
					engine coolant temperature	<= 122.96 °C		
					)			
					and			
					(			
					ambient temperature	>= -15.04 °C		
					and			
					ambient temperature	<= 199.86 °C		
					)			
					and			
					offset learning for turbo charger (VNT) actuator position sensor is active during idling	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- in order to compensate sensor drift and valve aging the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve			
					and			
					offset learned since last clearing of fault code memory	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					MIL not illuminated for DTCs:	= see sheet inhibit tables -		
Control Module Ignition Off Timer Performance	P2610	Detects a failure in the engine off timer calculation during ECM power up or afterrun, when the EOT timer IC is not responding	amount of retries in case of communication or bus error	> 5 counts	ignition	= on -	fail conditions exists for 0.01 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	B
					and			
					engine pre drive	= TRUE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure in the engine off timer if during the after run the internal SW timer and the EOT. A failure is detected when the respective timers are started after a calibration time then both are stopped, if the difference between the calculated timers is greatet that a threshold	**Path 1:**		time since engine post drive/ afterun	< 20 sec	fail conditions exists for 0.01 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	
			acquired stop counter time	< ((a) - (b - c))*d -	and			
			or		engine post drive/ afterun	= TRUE -		
			Path 2:		and			
			acquired stop counter time	> ((a) + (b - c))*d -	basic enable conditions met:	= see sheet enable tables -		
			(					
			where					
			(a)	= 100 %				
			and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) tolerance threshold	=	17.1875	%						
			and									
			(c) correction factor	=	7.5	%						
			and									
			(d) system time since engine post drive/ afterun	=	calculated parameter	-						
			)									
		Detects an interrupted supply voltage.	permanent supply voltage is interrupted	=	TRUE		ignition	=	on	-	fail conditions exists for more than 1 event monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel Injector Calibration Not Programmed	P268A	Detects un-programmed Injector Calibration Data (IQA) in ECM	**Path 1:**				engine pre drive	=	TRUE	-	fail conditions exist for 1 s monitor runs once per driving cycle during predrive with 1 s rate	A
			the checksum of the injector adjustment code words is correct	=	FALSE	-	and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
Cylinder 1 Injector Data Incorrect (IQA)	P268C	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 1 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 1 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 2 Injector Data Incorrect (IQA)	P268D	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 2 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 2 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	see sheet inhibit tables -		
Cylinder 3 Injector Data Incorrect (IQA)	P268E	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 3 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 3 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 4 Injector Data Incorrect (IQA)	P268F	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 4 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 4 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 5 Injector Data Incorrect (IQA)	P2690	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 5 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 5 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 6 Injector Data Incorrect (IQA)	P2691	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 6 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 6 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 7 Injector Data Incorrect (IQA)	P2692	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 7 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 7 are valid	= TRUE -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 8 Injector Data Incorrect (IQA)	P2693	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 8 transmitted via CAN from GPCM (glow plug module) match with the stored stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 8 are valid	= TRUE	fail conditions exist for 1 s test performed continuously with 1 s rate	A
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables		
4WD Switch Circuit	P2771	Checks plausibility of the 4WD-Low switch with 4WD state based on 4WD state from transmission turbine speed, transmission output shaft speed, and transmission gear ratio.	Debounced value of 4WD-Lo switch	= FALSE -	Current Transmission Gear	!= Park/Neutral -	fail conditions exists for 0.05 s test performed continuously 0.02 s rate	B
			and		and			
			4WD-Lo active based on transmission turbine speed, output shaft speed, and gear ratio	= TRUE -	Current Transmission Gear	!= Reverse -		
					and			
					Torque converter clutch open	= FALSE -		
					and			
					Engine is Running	= TRUE -		
					and			
					vehicle speed	> 12.43 mph		
					and			
					accelerator pedal position	< 100 %		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accelerator pedal position and engine speed and engine speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	> 10.00 % < 6000 rpm > 1000 rpm = see sheet enable tables - = see sheet inhibit tables -		
CAN A BUS OFF	U0073	BUS A off monitoring	CAN A Bus-Off reported by CAN hardware	= TRUE -	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 5 s test performed continuously 0.01 s rate	B
CAN B BUS OFF	U0074	BUS B off monitoring	CAN B Bus-Off reported by CAN hardware	= TRUE -	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 5 s test performed continuously 0.01 s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Lost communications with Transmission Control System	U0101	Detects loss of communication between ECM (on-board control unit) and TCM (transmission control module)	time since last message from transmission was received	>	0.0625	sec	ignition on	=	TRUE	-	fail conditions exists for 10 s test performed continuously 0.01 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Glowplug Module CAN Frame 1	U0106	Glowplug Module CAN message #1 frame not received after the specified number of times	counts up when message is not received in the base time interval	>	5	counts	Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fail condition exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Reductant Control Module	U010E	CAN frame not received after the specified number of times	counts up when message is not received in the base time interval (1.0 sec)	> 40 counts	CAN Bus is Active	= TRUE -	fail conditions exists for more than 5 seconds ; monitor runs every 0.02 s whenever enable conditions are met.	A
					Can Bus Initialized (CAN Bus is Active) consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5 sec		
					battery voltage	< 16 V		
					battery voltage	> 9 V		
		CAN message sliding window detection	DLS1 Sliding Window error counter	>= 8 counts	CAN Bus is Active	= TRUE -		
		Check of level sensor	within a number of message frames	= 9 counts	Can Bus Initialized (CAN Bus is Active) consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5 sec		
					battery voltage	< 16 V		
					battery voltage	> 9 V		
		CAN message sliding window detection	DLS2 Sliding Window error counter	>= 8 counts	CAN Bus is Active	= TRUE -		
		Check of temperature sensor	within a number of message frames	= 9 counts	Can Bus Initialized (CAN Bus is Active) consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage	<	16	V		
							battery voltage	>	9	V		
		CAN message sliding window detection	DLS3 Sliding Window error counter	>=	8	counts	CAN Bus is Active	=	TRUE	-		
		Check of error states	within a number of message frames	=	9	counts	Can Bus Initialized (CAN Bus is Active) consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5	sec		
							battery voltage	<	16	V		
							battery voltage	>	9	V		
Engine Out NOx Sensor Can Message #1	U029D	Detects a failure when a certain number of Engine Out NOx sensor relative NOx concentration messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx relative NOx concentration message group	>=	8	counts	Engine out NOx sensor CAN Message 1 Received	=	TRUE	-	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	A
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	FALSE	-		
							and					
							Engine out NOx sensor CAN Message 1 Enabled	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		
		Detects a failure when a certain number of Engine Out NOx sensor linear lambda messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx sensor status message group	>= 8 counts	Engine out NOx sensor CAN Message 1 Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
					and			
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= FALSE -		
					and			
					Engine out NOx sensor CAN Message 1 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Engine out NOx sensor CAN message #1 frame not received after the specified number of times	counts up when message is not received in the base time interval	>	5	counts	Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fault exists for more than 20 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
							consisting of:					
							ignition	=	TRUE			
							for					
							time	>	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	18.1	V		
Engine out NOx Sensor CAN Message #2		Detects a failure when a certain number of Engine Out NOx sensor error messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx sensor error status message group	>=	8	counts	Engine out NOx sensor CAN Message 2 Received	=	TRUE	-	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	FALSE	-		
							and					
							Engine out NOx sensor CAN Message 2 Enabled	=	TRUE	-		
							and					
							No rolling count or protection value errors. (sliding window errors)	=	TRUE	-		
							and					
							ignition	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects a failure when a certain number of Engine Out NOx sensor linear lambda messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx linear lambda signal message group	>= 8 counts	Engine out NOx sensor CAN Message 2 Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
					and			
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= FALSE -		
					and			
					Engine out NOx sensor CAN Message 2 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		
		NOx Sensor CAN Message #2 frame not received after the specified number of times	counts up when message is not received in the base time interval	> 5 counts	Can Bus Initialized (CAN Bus is Active)	= TRUE -	fault exists for more than 20 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
					consisting of:			
					ignition	= TRUE -		
					for			
					time	3 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage battery voltage	> 9.8 V < 18.1 V		
Engine out Nox Sensor CAN Message #3		Engine out NOx sensor CAN message #3 frame not received after the specified number of times	counts up when message is not received in the base time interval	> 5 counts	Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	= TRUE - = TRUE - 3 sec > 9.8 V < 18.1 V	fault exists for more than 20 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
		Detects a failure when a certain number of Engine Out NOx sensor oxygen concentration messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx oxygen concentration signal message group	>= 8 counts	Engine out NOx sensor CAN Message 3 Received and Inhibit Status (no inhibiting faults) (No pending or stored DTC) and	= TRUE - = FALSE -	fault exists for 1 message group ; monitor runs 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.
					Engine out NOx sensor CAN Message 3 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		
		Detects a failure when a certain number of Engine Out NOx sensor binary lambda messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx binary lambda signal message group	>= 8 counts	Engine out NOx sensor CAN Message 3 Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
					and			
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= FALSE -		
					and			
					Engine out NOx sensor CAN Message 3 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Engine out Nox Sensor CAN Message #4		Engine out NOx sensor CAN message #4 frame not received after the specified number of times	counts up when message is not received in the base time interval	>	25	counts	Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fault exists for more than 20 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time		3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	18.1	V		
		Detects a failure when a certain number of Engine Out NOx sensor heater resistance messages within a defined message group checksum or rolling count values are incorrect	Error count for engine out NOx heater resistance signal message group	>=	8	counts	Engine out NOx sensor CAN Message 4 Received	=	TRUE	-	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	FALSE	-		
							and					
							Engine out NOx sensor CAN Message 3 Enabled	=	TRUE	-		
							and					
							No rolling count or protection value errors. (sliding window errors)	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							ignition	=	TRUE	-		
Engine out Nox Sensor CAN Message #5		Engine out NOx sensor CAN message #5 frame not received after the specified number of times	counts up when message is not received in the base time interval	>	25	counts	Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fault exists for more than 20 seconds ; monitor runs every 0.1 s whenever enable conditions are met.	
							consisting of:					
							ignition	=	TRUE			
							for					
							time		3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	18.1	V		
Downstream NOx Sensor Can Message #1	U029E	Detects a failure when a certain number of Post Catalyst NOx sensor relative NOx concentration messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx sensor relative NOx concentration message group	>=	8	counts	Post Catalyst NOx sensor CAN Message 1 Received	=	TRUE	-	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	A
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	FALSE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOx sensor CAN Message 1 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		
		Detects a failure when a certain number of Post Catalyst NOx sensor linear lambda messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx sensor status message group	>= 8 counts	Post Catalyst NOx sensor CAN Message 1 Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
					and			
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= FALSE -		
					and			
					NOx sensor CAN Message 1 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Post Catalyst NOx sensor CAN message #1 frame not received after the specified number of times	counts up when message is not received in the base time interval	>	5	counts	Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fault exists for more than 21 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time		3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	18.1	V		
Post Catalyst NOx Sensor CAN Message #2		Detects a failure when a certain number of Post Catalyst NOx sensor error messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx sensor error status message group	>=	8	counts	Post Catalyst NOx sensor CAN Message 2 Received	=	TRUE	-	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	FALSE	-		
							and					
							NOx sensor CAN Message 2 Enabled	=	TRUE	-		
							and					
							No rolling count or protection value errors. (sliding window errors)	=	TRUE	-		
							and					
							ignition	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a failure when a certain number of Post Catalyst NOx sensor linear lambda messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx linear lambda signal message group	>=	8	counts	Post Catalyst NOx sensor CAN Message 2 Received	=	TRUE	-	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
							and					
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	FALSE	-		
							and					
							NOx sensor CAN Message 2 Enabled	=	TRUE	-		
							and					
							No rolling count or protection value errors. (sliding window errors)	=	TRUE	-		
							and					
							ignition	=	TRUE	-		
		NOx Sensor CAN Message #2 frame not received after the specified number of times	counts up when message is not received in the base time interval	>	5	counts	Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fault exists for more than 21seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time		3	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage battery voltage	> 9.8 V < 18.1 V		
Post Catalyst Nox Sensor CAN Message #3		Post Catalyst NOx sensor CAN message #3 frame not received after the specified number of times	counts up when message is not received in the base time interval	> 5 counts	Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	= TRUE - = TRUE - 3 sec > 9.8 V < 18.1 V	fault exists for more than 21 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
		Detects a failure when a certain number of Post Catalyst NOx sensor oxygen concentration messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx sensor oxygen concentration signal message group	>= 8 counts	Post Catalyst NOx sensor CAN Message 3 Received and Inhibit Status (no inhibiting faults) (No pending or stored DTC) and NOx sensor CAN Message 3 Enabled	= TRUE - = FALSE - = TRUE -	fault exists for 1 message group ; monitor runs 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.
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		
		Detects a failure when a certain number of Post Catalyst NOx sensor binary lambda messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx sensor binary lambda signal message group	>= 8 counts	Post Catalyst NOx sensor CAN Message 3 Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
					and			
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= FALSE -		
					and			
					NOx sensor CAN Message 3 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			
					ignition	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Nox Sensor CAN Message #4		Post Catalyst NOx sensor CAN message #4 frame not received after the specified number of times	counts up when message is not received in the base time interval	> 25 counts	Can Bus Initialized (CAN Bus is Active)	= TRUE -	fault exists for more than 20 seconds ; monitor runs every 0.05 s whenever enable conditions are met.	
					consisting of:			
					ignition	= TRUE -		
					for			
					time	3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 18.1 V		
		Detects a failure when a certain number of Post Catalyst NOx sensor heater resistance messages within a defined message group checksum or rolling count values are incorrect	Error count for post catalyst NOx sensor heater resistance signal message group	>= 8 counts	Post Catalyst NOx sensor CAN Message 4 Received	= TRUE -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	
					and			
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= FALSE -		
					and			
					NOx sensor CAN Message 4 Enabled	= TRUE -		
					and			
					No rolling count or protection value errors. (sliding window errors)	= TRUE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ignition	= TRUE -		
Post Catalyst Nox Sensor CAN Message #5		Post Catalyst NOx sensor CAN message #5 frame not received after the specified number of times	counts up when message is not received in the base time interval	> 25 counts	Can Bus Initialized (CAN Bus is Active)	= TRUE -	fault exists for more than 21 seconds ; monitor runs every 0.1 s whenever enable conditions are met.	
					consisting of:			
					ignition	= TRUE		
					for			
					time	3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 18.1 V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug switch defect and open	P064C	Electronic circuitry determines fault with GP switch	Glow Plug Current and Glow plug is commanded and voltage at glow plug	< 6.6 A = On = 0 volts	glow plugs are commanded on DTCs P163E, P163C, P0671-P0678	= True Not set	500ms (Internal) + 75% failure rate over 4 seconds. (Same as x out of y 75% failure out of 4 sec of sample time ie out of 8 samples 6 must fail to log a failure)	B
ROM error		Checksum error between calculated and stored values are compared	Checksums match	= NO -	Module power	= On	1.5 seconds (internal)+75% failure rate over 4 seconds.	B
RAM error		Compariarson of read write values	Read write values match	= NO -	Module power	= On	200ms (internal) + 75% failure rate over 4 seconds.	B
EEPROM error		Checksum error between calculated and stored values	Checksums match	= NO -	Module power	= On	200ms (internal) + 75% failure rate over 4 seconds.	B
Charge Pump Under Voltage		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Voltage	<= Battery voltage at GPCM + 7 volts	Battery voltage at GPCM	> 6 volts	130ms (internal) + 75% failure rate over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Charge Pump Over Voltage		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Voltage	>= Battery voltage at GPCM + 18 volts	Battery	< 19.9 volts	160ms (internal) + 75% failure rate over 4 seconds.	B
GPCM reverse polarity switch "high voltage drop"		Elecrtonic circuitry determines that the reverse polarity protection voltage drop is in range	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) ie. delta from charge pump on to charge p	> 2.3 volts < 300 mvolts	glow plugs are commanded Battery voltage at GPCM GP current GP current P0671,P0672, P0675, P0676 Battery voltage at GPCM stable for 30ms	= On > 6 volts > 6 amps < 60 amps = Not set < 2 volts	path1 6000ms, path2 10 seconds + 75% failure rate over 4 seconds.	B
GPCM running reset		Internal and external Watchdogs are monitored for interuption Monitor for undefined instruction code interupt Monitor for osolation stop detection	number of running resets or undefined instruction code detected or Osolation stop detection	> 9 events in a row	none		2 seconds (internal) + 75% failure rate over 4 seconds.	B
difference between internal and external value of battery voltage too high		GMLAN Battery voltage from ECM is compared to GPCM internal measured battery voltage	abs[GPCM internal measured battery voltage - GMLAN Battery voltage]	'> 3 volts	glow plugs are commanded GMLAN battery signal glow command message Battery voltage at GPCM RPM RPM	= On = valid = valid > 6 volts <= 10 <= 400	190ms (internal) + 75% failure rate over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
system basic chip VSUPLOW		monitor internal chip supply voltage	internal chip supply voltage	< = 5.8 volts	Intake Air Heater commanded Battery supply at GPCM	= On > 9 volts	130ms (internal) + 75% failure rate over 4 seconds.	B
system basic chip (SBC) over temperature		measure temperature of the SBC	temperature of the high side switch inside the SBC	> 155 degC	Internal GPCM temperature	< 100 deg C	130ms (internal) + 75% failure rate over 4 seconds.	B
NOx sensor power supply fault		Electronic circuitry detects a failure in the NOx sensor power supply	Path1: DC/DC booster current. For Path 2: DC/DC booster current. Path 3: Voltage at main switch Path 4: (DC/DC Booster voltage - GPCM battery voltage)	> 25 amps > 640 msec > > 60 amps by hardware protection (time varies with temperature) amps = 0 volts = ± 3 volts	Battery voltage at the GPCM Battery voltage at the GPCM	> 6 volts = 8 to 14 volts	6 seconds (internal) + 75% failure rate over 4 seconds.	B
DEF heater current not calibrated.		Checksum error between calculated and stored values	Checksums match	= No	Ignition on		200ms (internal) + 75% failure rate over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
glow plug open	P0671- P0678	Electronic circuitry determines a fault exists on GP circuit	Glow Plug Current and Voltage at glow plug pin	< 4.25 A and > 6.0 Volt	Ignition - glow plugs are commanded on P163E,P163D,P163C Supply voltage	= On > 5 secs not set > 6 volts	130ms (internal) + 66% failure rate over 1.5 seconds.	B
glow plug short		Electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Current Path 2: Hardware over current	> 60 A > 80 A	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	Condition 1 : 130ms, Condition 2: 260ms (internal) + 66%failure over 1.5 seconds.	B
glow plug high resistance		Electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance AND Glow Plug Current	> 1.0 Ohm >= 4.25 A	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 volts = on = false false < 7.0 volts	160ms (internal) + 66% failure over 1.5 seconds.	B
Glow plug low resistance		Electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance	< 250 mOhm	glow plugs are commanded on over temperature condition over voltage condition- abs[Battery supply at GPCM - IGN voltage at GPCM]	= on = false = false < 7.0 volts	160ms (internal) + 66% failure over 1.5 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Calibration Information Not Programmed – GPCM	P160C	ECM monitors serial data from GPCM for P160C Error Message indicating GPCM is not programmed with injector trim values.	Glow Plug Control Module determines IQA data has not been programmed in the GPCM		Ignition	ON	200ms (internal) + 66% failure over 1.5 seconds.	A
Intake Air (IA) Heater Feedback Circuit	P154A	Electronic GPCM circuitry determines if faults related to the IA heater feedback circuit exist.	PATH1: IAH indicates its state is AND IAH current OR PATH2: IAH indicates its state is	OFF > 20 A = ON	DTCs not active Path1 IAH Commanded and Battery Voltage at IAH OR Path2 IAH Commanded	P0640, P154B, P154D, P154C, P166B = ON > 8.6 volts = OFF	650ms (internal) + 75% failure over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air (IA) Heater Voltage Signal Circuit	P154B	Electronic GPCM circuitry determines if faults related to the voltage level present at the IA heater exist.	PATH1: IAH Battery voltage AND GPCM Battery Voltage GPCM Battery Voltage OR PATH2: Voltage signal line IAH Battery voltage OR PATH3: IAH Battery voltage AND GPCM IGN voltage AND GPCM Battery Voltage IAH Battery voltage	> 16.0 Volt > 9.5 volts < 14.0 Volt > 1.5 Volt < 6.9 Volt > 6.9 Volt < 16.0 volt > 9.5 Volt	DTCs not active Path 1 IAH Commanded Path 2 IAH Commanded Path 3 DTCs not active IAH Commanded	P0640, P154D, P154C, P166B = ON = OFF for more then 65 msec = P064C, P154D, P154C, P166B ON	1s (internal) + 75% failure over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air (IA) Heater Current Signal Circuit	P154C	Electronic GPCM circuitry determines if faults related to the IA heater current signal circuit or heater grid exist.	PATH1: IAH current IAH voltage signal feedback to GPCM or PATH2: IAH current IAH voltage signal feedback to GPCM or PATH3:IAH current signal feedback to GPCM or PATH 4:IAH grid current IAH heater grid calculated resistance	< 20 Amps > 0.9 Volts < 20 Amps < 0.9 Volts > 4.96 Volts > 20 A > 500 mOhm	DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage or DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage or IAH Command or DTC's are not set IAH Commanded Battery Voltage at IAH	P154B, P154D, = P0640, > P0154A Volt >= ON Volt 6.9 6.9 = P154B, > P154D, Volt >= P0640, Volt P0154A ON 6.9 = 6.9 off = > Volt P154B, P154D, P0640, P0154A ON 8.0	up to 5000ms (internal) + 75% failure over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air (IA) Heater Temperature Signal Circuit	P154D	Electronic GPCM circuitry determines if faults related to the temperature feedback circuit of the IA heater exist.	PATH1: IAH temperature signal feedback line or PATH2: IAH temperature AND GMLAN signal "IntakeAirTemperature" or PATH3:IAH temperature signal feedback line or PATH4: IAH temperature signal feedback line	< 0.156 Volt < -20 °C > +20 °C = Open > 4.96 Volt	DTC's are not set IAH Commanded Battery Voltage at IAH PWM IAH IAH running time or DTC's are not set IAH Commanded Battery Voltage at IAH Engine General Status (engine sensor info) IntakeAirtemperature message from ECM or IAH Commanded act	P154B, P0640, P0154A, P154C, P166B = ON > 11.0 Volts > 90.0 % > 2 minutes P154B, P0640, P0154A, P154C, P166B = ON > 11.0 Volts = valid = valid = = OFF ON = > < P154B, P0640, P0154A, P154C, P166B ON 6.0 Volts 15.0 Volts	650ms (internal) + 75% failure over 4 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air (IA) Heater Switch/Control Circuit	P0640	Electronic GPCM circuitry determines if faults related to the control circuit of the IA heater exist.	Activation Reply signal (digital response) from IAH	= high when heartbeat signal is activated	DTC's are not set IAH Commanded	P154A = OFF	2000ms (internal) + 75% failure over 4 seconds.	B
Intake Air (IA) Heater Over Temperature	P166B	ECM monitors serial data from GPCM for P166B Error Message indicating GPCM detects IAH overtemperature	Internal Temperature of IAH module	> 80 °C	DTC's are not set IAH Commanded engine run time Battery Voltage at IAH	P154B,P154C, P0640, P154D = ON > 40 sec < 6.9 Volt	650ms (internal) + 75% failure over 4 seconds.	B
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	200ms (internal) + 75% failure over 4.0 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold 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 the GPCM or PATH 2: Voltage supply to GPCM or PATH 3: (IGN - Voltage supply to GPCM) or PATH 4: (ECM reported voltage via CAN - Voltage supply to GPCM)	> 16.5 Volt < 6.0 volts > +/-5 volts > +/-3 volts	GPCM Ignition voltage or GPCM Ignition voltage or GPCM Voltage supply GPCM Ignition Voltage or GPCM supply voltage Engine speed	> 9.0 Volts < 14 Volts > 9.0 Volts < 16 Volts > 6.0 Volt > 4.0 Volt > 6 volts 10< rpm >400	1000ms (internal) + 75% failure over 4.0 seconds.	B
Glow Plug Module Secondary Circuit	P163D	Electronic GPCM circuitry determines serveral signal voltage levels to GPCM are out of range	Path 1 glow plug activation request from ECM or Path 2: Electronic circuitry determines voltage at glow plug pin or Path 3: [GPCM ground - GP ground]	= ON > 6.0 Volt > 1.5 Volts	Path 1: Key state (Ign 1) or Path 2 GP commanded or Path 3 GP commanded DTCs not set IAH dutycycle	= OFF or = Off or = ON P0671,P0 = 675 % 0 or 100	1000ms (internal) + 75% failure over 4.0 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Glow Plug Module Overtemperature	P163E	ECM monitors serial data from GPCM for P163E Error Message indicating GPCM detects GPCM overtemperature	GPCM Temperature	> 85 °C	GMLAN signal "coolant temperature"	< 60 °C	650ms (internal) + 75% failure over 4.0 seconds.	B
Reductant Heater 1 Control Circuit	P20B9	ECM monitors serial data from GPCM for P20B9 Error Message indicating GPCM detects reductant heater not connected to GPCM or an interruption	Active test function; Connected heater must discharge internal capicitor. Voltage at capacitor checked by GPCM		DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage and	P220B = ON < 123 °C > 7.0 Volts < 16.0 Volts	3440ms (internal) + 50% failure over 1.0 seconds.	B
Reductant Heater 1 Control Circuit Low Voltage	P20BB	ECM monitors serial data from GPCM for P20BB Error Message indicating GPCM detects reductant heater output shorted to ground or an overload condition	Path 1: Glow Plug Current or Path 2: Hardware over current	> 25 A or > 80 A	reductan heater commanded: GPCM temperature GPCM Battery supply voltage or reductan heater commanded: GPCM temperature GPCM Battery supply voltage	= ON < 123 °C > 7.0 Volts < 16.5 Volts or or or = ON < 123 °C > 7.0 Volts < 16.5 Volts	1000ms (internal) + 50% failure over 1.0 seconds.	B

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	ECM monitors serial data from GPCM for P20BC Error Message indicating GPCM detects reductant heater to be shorted to battery	Electronic circuitry determines voltage at reductant heater pin	> 3.5 volts	reductan heater commanded:	= OFF	2000ms (internal) + 50% failure over 1.0 seconds.	B
Reductant Heater 2 Control Circuit	P20BD	ECM monitors serial data from GPCM for P20BD Error Message indicating GPCM detects reductant heater not connected to GPCM or an interruption	Active test function; Connected heater must discharge internal capicitor. Voltage at capacitor checked by GPCM		DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage and	P20BF = ON < 123 °C > 7.0 Volts < 16.0 Volts	3440ms (internal) + 50% failure over 1.0 seconds.	B
Reductant Heater 2 Control Circuit Low Voltage	P20BF	ECM monitors serial data from GPCM for P20BF Error Message indicating GPCM detects reductant heater output shorted to ground or an overload condition	Path 1: Reductant Heater Plug Current or Path 2: Hardware over current	> 25 A or > 80 A	reductan heater commanded: GPCM temperature GPCM supply voltage KL30 or reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON < 123 °C > 7.0 Volts < 16.5 Volts or or or = ON < 123 °C > 7.0 Volts < 16.5 Volts	1000ms (internal) + 50% failure over 1.0 seconds.	B

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	ECM monitors serial data from GPCM for P20C0 Error Message indicating GPCM detects reductant heater to be shorted to battery	Electronic circuitry determines voltage at reductant heater pin	> 3.5 volts	reductan heater commanded:	= OFF	2000ms (internal) + 50% failure over 1.0 seconds.	B
Reductant Heater 3 Control Circuit	P20C1	ECM monitors serial data from GPCM for P20C1 Error Message indicating GPCM detects reductant heater not connected to GPCM or an interruption	Active test function; Connected heater must discharge internal capicitor. Voltage at capacitor checked by GPCM		DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage and	P20C3 = ON < 123 °C > 7.0 Volts < 16.0 Volts	3440ms (internal) + 50% failure over 1.0 seconds.	B
Reductant Heater 3 Control Circuit Low Voltage	P20C3	ECM monitors serial data from GPCM for P20C3 Error Message indicating GPCM detects reductant heater output shorted to ground or an overload condition	Path 1: Glow Plug Current or Path 2: Hardware over current	> 25 A or > 80 A	reductan heater commanded: GPCM temperature GPCM supply voltage KL30 or reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON < 123 °C > 7.0 Volts < 16.5 Volts or or or = ON < 123 °C > 7.0 Volts < 16.5 Volts	1000ms (internal) + 50% failure over 1.0 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 3 Control Circuit High Voltage	P20C4	ECM monitors serial data from GPCM for P20C4 Error Message indicating GPCM detects reductant heater to be shorted to battery	Electronic circuitry determines voltage at reductant heater pin	> 3.5 volts	reductan heater commanded:	= OFF	2000ms (internal) + 50% failure over 1.0 seconds.	B
Nox Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	ECM monitors serial data from GPCM for P220A Error Message indicating GPCM detects DC/DC booster output shorted to ground or shorted to battery	PATH 1:GPCM Electronic circuitry determines voltage at DC/DC booster output pin or PATH 2: DC/DC booster output current duration or PATH 3: DC/DC booster output current duration	> 5.0 Volt > 5.0 A > 10 ms > 37.5 A > 20 µs	status DC/DC booster or status DC/DC booster or status Dc/DC booster	= OFF, power up procedure has started after reset = ON = ON	5000ms (internal) + 50% failure over 1.0 seconds.	B

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	ECM monitors serial data from GPCM for P220B Error Message indicating GPCM detects DC/DC booster output shorted to ground or shorted to battery	PATH 1:Electronic circuitry determines voltage at DC/DC booster output pin or PATH 2: DC/DC booster output current duration or PATH 3: DC/DC booster output current duration	> 5.0 Volt > 5.0 A > 10 ms > 37.5 A > 20 µs	status DC/DC booster or status DC/DC booster or status Dc/DC booster	= OFF, power up procedure has started after reset = or ON or = ON	5000ms (internal) + 50% failure over 1.0 seconds.	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Temperature Sensor 2 Circuit Low	P0187	Detects low voltage readings in the fuel temperature sensor 2 circuit, indicating an OOR low condition on the fuel temperature sensor 2 circuit	voltage of fuel temperature sensor 2	<	0.5982	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as fuel temperature	>	150	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 2 Circuit High	P0188	Detects high voltage readings in the fuel temperature sensor 2 circuit, indicating an OOR high condition on the in fuel temperature sensor 2 circuit	voltage of fuel temperature sensor 2	>	4.7456	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as fuel temperature	<	-0.5	°C	and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit High	P0463	Detects high voltage readings in the fuel level sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 1	>	4.8	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
			same as fuel level	<	0	%	and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Level Sensor 1 Circuit Low	P0462	Detects low voltage readings in the fuel level sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 1	<	0.2	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
			same as fuel level	>	100	%	and basic enable conditions met:	=	see sheet enable tables	-		
Primary Fuel Sensor Performance	P0461	Detects an error in the primary fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	>=	100	miles	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with (a) total vehicle distance	=	measured parameter	-	for time	>=	60	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and with		and			
			(b) change in mileage	= measured parameter -	diagnosis tester	= FALSE -		
					and			
			and		fuel transfer pump active	= FALSE -		
			(c) - (d)	< 4.50 %	means			
			with		(			
			(c) maximum volume of fuel reached in primary tank during driving cycle	= measured parameter -	filtered fuel volume in primary tank	> 88.80 %		
			and with		and			
			(d) minimum volume of fuel reached in primary tank during driving cycle	= measured parameter -	filtered fuel volume in secondary tank	< 6.61 %		
					for			
					time	>= 300 sec		
					and			
					cumulative transfer pump on time in current ignition cycle	> 32767 sec		
					)			
					and			
					fuel level zone 3	= TRUE -		
					means			
					(			
					filtered fuel volume in primary tank	< 99.93 %		
					and			
					filtered fuel volume in secondary tank	> 1.32 %		
					)			
					or			
					fuel level zone 4	= TRUE -		
					means			
					(			
					filtered fuel volume in primary tank	< 99.93 %		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					filtered fuel volume in secondary tank	<=	1.32	%		
					)					
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Pump Control Circuit Applies GMT610 application only	P0627	Electronic out-put driver circuitry determines that the fuel lift pump circuit is open.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition	=	on	-	fail conditions exists for 2 s monitor runs 0.02 s rate whenever enable conditions are met	B
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Pump Control Circuit Low Applies GMT610 application only	P0628	Electronic out-put driver circuitry determines that the fuel lift pump circuit is shorted to ground.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition and basic enable conditions met:	= =	on see sheet enable tables	- -	fail conditions exists for 1 s monitor runs 0.02 s rate whenever enable conditions are met	B
Fuel Pump Control Circuit High Applies GMT610 application only	P0629	Electronic out-put driver circuitry determines that the fuel lift pump circuit is shorted to voltage.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition and basic enable conditions met:	= =	on see sheet enable tables	- -	fail conditions exists for 0.5s monitor runs 0.02 s rate whenever enable conditions are met	B

<table>
<tr><th>Component / System</th><th>Fault Code</th><th>Monitor Strategy Description</th><th>Primary Malfunction Criteria</th><th colspan="3">Threshold Logic and Value</th><th>Secondary Parameters</th><th colspan="3">Enable Conditions</th><th>Time Required</th><th>MIL Illum.</th></tr>
<tr><td>Intake Air Temperature (IAT) Sensor 1 - Fuel Temperature Sensor 2 Not Plausible</td><td>P111D</td><td>Detects bias Fuel Temperature Sensor 2 or Intake Air Temperature Sensor by comparing the measured temperature at start.</td><td>Path 1:</td><td></td><td></td><td></td><td>minimum engine-off time</td><td>>=</td><td>28800</td><td>sec</td><td>fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met</td><td>B</td></tr>
<tr><td></td><td></td><td></td><td>|(a) - (b)| (see Look-Up-Table #1)
where</td><td>></td><td>100 to 999</td><td>°C</td><td>and</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(a) captured intake air temperature at start</td><td>=</td><td>measured parameter</td><td>-</td><td>ambient air temperature
and</td><td>></td><td>-60.04</td><td>°C</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>and</td><td></td><td></td><td></td><td>Engine Running (see parameter definition)</td><td>=</td><td>TRUE</td><td>-</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(b) captured fuel temperature 2 at start</td><td>=</td><td>measured parameter</td><td>-</td><td>for</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Applies GMT610

application only</td><td></td><td></td><td></td><td></td><td></td><td></td><td>time</td><td>></td><td>0</td><td>sec</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>or
Path 2:</td><td></td><td></td><td></td><td>and
engine post drive/ afterun</td><td>=</td><td>FALSE</td><td>-</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(
|(a) - (b)| (see Look-Up-Table #1)
where</td><td><=</td><td>100 to 999</td><td>°C</td><td>and
diagnostic performed in current dc</td><td>=</td><td>FALSE</td><td>-</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(a) captured intake air temperature at start</td><td>=</td><td>measured parameter</td><td>-</td><td>and
basic enable conditions met:</td><td>=</td><td>see sheet enable tables</td><td>-</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>and
(b) captured fuel temperature 2 at start</td><td>=</td><td>measured parameter</td><td>-</td><td>and
NO Pending or Confirmed DTCs:</td><td>=</td><td>see sheet inhibit tables</td><td>-</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>and
|(a) - (b)| (see Look-Up-Table #2)
where</td><td>></td><td>20 to 999</td><td>°C</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) captured intake air temperature at start	=	measured parameter	-						
			and (b) captured fuel temperature 2 at start	=	measured parameter	-						
			and (status of block heater (see parameter definition)	=	FALSE	-						
			or status of sun-load detection (see parameter definition)))	=	FALSE	-						
PTO Engine Speed Request Signal Message Counter Incorrect	P1598	If the number of communication errors in a calibrated number of frames exceeds a threshold a permanent error is detected	Number of errors in window	>=	4	counts	Number of frames received	>=	10	counts	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	Special C
							Can Bus Initialized consisting of: ignition on	=	TRUE			
							for time		3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.35	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Vane Position Slow Response - Decreasing Position	P168C	Detects slow responding turbo charger vanes. Actual positional readings are compared to desired values.	average positive gradient of the turbocharger vane commanded position - calculated by accumulating deviation between desired and actual value of vane position over a calibrated sampling time	>= 9.99755859 %	(		fail conditions exists for 15 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					turbocharger vane desired position gradient	> 0.61035 %/sec		
					and			
					turbocharger vane desired position gradient	< 29.9072 %/sec		
					)			
					and			
					control deviation of turbocharger vane position calculated out of difference between desired and actual value	> 0 %		
					)			
					)			
					for			
					time	> 0.2 sec		
					and			
					(			
					engine speed	>= 1000 rpm		
					and			
					engine speed	<= 3000 rpm		
					)			
					and			
					ambient pressure	> 74.8 kPa		
					and			
					engine temperature	> 69.96 °C		
					and			
					ambient air temperature	> -7.04 °C		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet enable tables -		
Turbocharger Vane Position Slow Response - Increasing Position	P168D	Detects slow responding turbo charger vanes. Actual positional readings are compared to desired values.	average negative gradient of the turbocharger vane commanded position - calculated by accumulating deviation between desired and actual value of vane position over a calibrated sampling time	>= 11.9995117 %	(		fail conditions exists for 15 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					turbocharger vane desired position gradient	> -29.907 %/sec		
					and			
					turbocharger vane desired position gradient	< -0.6104 %/sec		
					)			
					and			
					control deviation of turbocharger vane position calculated out of difference between desired and actual value	< 0 %		
					)			
					)			
					for			
					time	> 0.2 sec		
					and			
					(			
					engine speed	>= 1000 rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					engine speed	<= 3000 rpm		
					)			
					and			
					ambient pressure	> 74.8 kPa		
					and			
					engine temperature	> 69.96 °C		
					and			
					ambient air temperature	> -7.04 °C		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet enable tables -		
Secondary Fuel Sensor Performance	P2066	Detects an error in the secondary fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	< 100 miles	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for 0.02s monitor runs 0.02 s rate whenever enable conditions are met	B
			with		for			
			(a) total vehicle distance	= measured parameter -	time	>= 60 sec		
			and with		and			
			(b) change in mileage	= measured parameter -	diagnosis tester connected	= FALSE -		
			and		and			
			(c) - (d)	< 2.64 %	fuel transfer pump active	= FALSE -		
			with		means			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(c) maximum volume of fuel reached in secondary tank during driving cycle	=	measured parameter	-	(					
			and with (d) minimum volume of fuel reached in secondary tank during driving cycle	=	measured parameter	-	(filtered fuel volume in primary tank	>	88.80	%		
			and filtered fuel volume in secondary tank	>	0	%	or filtered fuel volume in secondary tank	<	6.61	%		
							for time	>	300	sec		
							and cumulative transfer pump on time in current ignition cycle	>	32767	sec		
							) and fuel level zone 1 means (					
							filtered fuel volume in primary tank	>=	99.93	%		
							and filtered fuel volume in secondary tank	>=	1.32	%		
							) and basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Level Sensor 2 Circuit Low	P2067	Detects low voltage readings in the fuel level sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 2	<	0.2	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
			same as fuel level	>	100	%	and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Level Sensor 2 Circuit High	P2068	Detects high voltage readings in the fuel level sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 2	>	4.8	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
			same as fuel level	<	0	%	and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Transfer Pump Relay Control Circuit	P2632	Electronic out-put driver circuitry determines that the tank transfer pump circuit is open.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met	B
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Fuel Transfer Pump Relay Control Circuit Low	P2633	Electronic out-put driver circuitry determines that the tank transfer pump circuit is shorted to ground.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met	B
					and					
					basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Transfer Pump Relay Control Circuit High	P2634	Electronic out-put driver circuitry determines that the tank transfer pump circuit is shorted to battery.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ignition on	= TRUE -	fail conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met	B
					and basic enable conditions met:	= see sheet enable tables -		
Fuel Transfer Pump Performance	P2636	Detects an error in the fuel tank transfer pump performance by comparing the decrease of the fuel level in both tanks.	**Path 1:**		(		fail conditions exists for 140s monitor runs 0.02 s rate whenever enable conditions are met	B
			change in fuel volume in primary tank	< 0.90 %	Engine Running (see parameter definition)	= TRUE -		
			and change in fuel volume in secondary tank	< 0.53 %	and fuel transfer pump active	= TRUE -		
			or **Path 2:** change in fuel volume in primary tank	< 0.90 %	means ((			
			and		filtered fuel volume in primary tank	< 71.94 %		
			change in fuel volume in secondary tank	>= 0.53 %	or			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			or				filtered fuel volume in secondary tank	>	6.61	%		
			Path 3:				and					
			change in fuel volume in primary tank	>=	0.90	%	time between activations of transfer pump	>	5	sec		
			and				and					
			change in fuel volume in secondary tank	<	0.53	%	and					
							fuel level zone 5 means					
							(					
							filtered fuel volume in primary tank	<	99.93	%		
							and					
							filtered fuel volume in secondary tank	>	1.32	%		
							)					
							)					
							vehicle speed	<=	0	mph		
							and					
							diagnosis tester	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for					
							time	>	20	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communications With Auxiliary Heater Control Module	U0166	Fuel Operated Heater (FOH) Message not received for a specified number of times	counts up when message is not received in the base time interval	> 5 counts	Can Bus Initialized (CAN Bus is Active)		fault exists for more than 10 seconds; monitor runs every 0.01 s whenever enable conditions are met.	Special C
					consisting of:			
					ignition	= TRUE -		
					for time	>= 3.00 sec		
Applies GMT610 application only					battery voltage	> 11.00 V		
					battery voltage	< 27 V		

Contains definitions of secondary parameters which are used in the parameter document.
These secondary parameters conditions are shown in the respective physical parameters which define each condition.

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
Battery Voltage		Battery Voltage Correction Factor	battery voltage correction factor			
			= Nominal Declared Battery Voltage divided by measured battery voltage	=	13.6	V
Engine Cooling System States		Status of the Block Heater	active under following conditions			
			(			
			engine speed	>	500	rpm
			for			
			time	>	60	sec
			and			
			(a) - (b)	>	1.8	°C
			with			
			(a) reference temperature (engine coolant temperature) captured during start	=	measured parameter	-
			and with			
			(b) engine coolant temperature	=	measured parameter	-
			)			
		status of Block Heater monitor time	active under following conditions			
			(			
			engine speed	>	500	rpm
			for			
			time	>	60	sec
		Status of Sun Load Detection	active under following condition			
			(			
		(high thermal input from the sun	Vehicle speed	>	14.92	mph

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		which influences system behavior)	for			
			time	>	300	sec
			and			
			engine speed (see Look-Up-Table #14)	>	600 to 850	rpm
			for			
			time	>	600	sec
			and			
			(a) - (b)	>	4.5	°C
			with			
			(a) intake at temperature at start	=	measured parameter	-
			and with			
			(b) minimum intake air temperature value for the comparison with the reference temperature during driving cycle	=	measured parameter	-
			)			
		Status of Sun Load Detection time	active under following condition			
			(			
			Vehicle speed	>	14.92	mph
			for			
			time	>	300	sec
			and			
			engine speed (see Look-Up-Table #14)	>	600 to 850	rpm
			for			
			time	>	600	sec
			)			
ECM Operating States		Engine Pre-Drive	processor operating normally	=	TRUE	-
			ignition	=	OFF	-
			processor powerup boot initialization	=	complete	-
			or			
			key off bookkeeping cleanup	=	complete	-
			(accessory, post-wake-up, pre-sleep)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Engine Running (see Look-Up table #70)	ignition	=	ON	-
			engine speed	>=	100	rpm
			engine speed was at start	>	850	rpm
		Engine Post-Drive/ Afterun	processor operating normally	=	TRUE	-
		also includes "engine stopping" during engine spin down	ignition	=	OFF	-
			key off bookkeeping cleanup	=	in process	-
Engine Operating Modes	Exhaust Operating Mode focus	Normal Mode				
		Particulate Filter Regeneration Mode				
		Particulate Filter Regen Service Mode				
		Exhaust Gas Temperature (Active) Management Mode		=	Warm Up or Maintain Temperature	-
		also known as Engine Operating Mode		=	Exhaust Warm-up	
Exhaust Gas Recirculation (EGR)		Exhaust Gas Recirculation (EGR) Control is enabled	EGR controller is active continuously with exceptions			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			for failures detected EGR controller is active Overrun Long Idle Transmission Gear Shift Cold Start extreme temperature or pressure Critical Regeneration Modes			
			Overrun			
			Gear Shifting			
			Overlong Idle			
			permanent control deviation			
			Demand of the drift compensation			
			System error			
			Error exhaust gas recirculation valve			
			Error throttle valve			
			Engine Brake Status			
			Atmospheric pressure too low			
			Battery voltage too low			
			Switch-off coordinator			
			Environmental temperature too low			
			Environmental temperature too high			
			Engine temperature too low			
			Engine temperature too high			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Cold start			
			Injection quantity too large			
			Operating-mode coordinator			
			Rich Idle			
			External control intervention			
			Rich Idle Regen			
			Environmental Temperature too low in Regeneration			
			EGR Stroking			
			EGR controller is active in Overrun (warm exhaust system)			
			EGR controller is active in Overrun (Cold exhaust system)			
			AFS Faults			
			Request via SCR monitoring (NOx sensor plausibility check)			
			Atmospheric Pressure too low in Regeneration			
			Engine Temperature too low in Regeneration			
			Engine Temperature too high in Regeneration			
Engine Position Management		Engine Position Sync Complete	synchronization completed consisting of: crankshaft sensor pulses received camshaft sensor pulse received and aligned properly			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			or sync via crank only invoked then crankshaft rotations	>=	4	counts
Fuel System		Fuel System is in Fuel Shut Off	engine running	=	TRUE	-
		also known as Decel Fuel Shut Off or Over-Run	required actual engine torque	<	1	Nm
			-	-	-	-
		Status of Diesel Fuel Refill Detection	((			
			Filtered total fuel volume available	>	(a) + (b)	-
			(a) Amount of fuel volume change that indicates a refueling event occurred	=	25.26	%
			(b) captured remaining diesel fuel volume under the following conditions	=	measured parameter	-
			(			
			Vehicle speed	<=	1.24	mph
			time	>	4	sec
			)			
			and			
			(			
			Vehicle speed	<=	1.24	mph
			time	>	30	sec
			))			
			or			
			at initialization of Diesel fuel level	=	TRUE	-
Idle Speed Control		Idle Speed Controller Active	no overrides for:			
		"normal" low idle speed governor	Gear-Shift Harmonization			
			Intrusive Diagnosis Action Power Take Off or other working load handling			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Engine Idling Time Ratio	= (time accumulated at idle divided by time since engine start)			
NOx Sensor		Status of NOx signal of upstream NOx sensor	(			
			following condition met for time:	>	30	sec
			(			
			Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			NOx status signal received via CAN message (Please see the definition)	=	TRUE	-
			for time	>	0.5	sec
			calculated lambda value based on air mass flow and injection quantity	>	0.9	-
			for time	>	0.5	sec
			engine speed	>	100	rpm
			for time	>	20	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Status of NOx signal of downstream NOx sensor	(			
			following condition met for time:	>	30	sec
			(			
			Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
			NOx status signal received via CAN message (Please see the definition)	=	TRUE	-
			for time	>	0.5	sec
			calculated lambda value based on air mass flow and injection quantity	>	0.9	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			for time	>	0.5	sec
			engine speed	>	100	rpm
			for time	>	20	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Enabling Downstream NOx sensor heater diagnosis				
			(			
			SCR Catalyst downstream temperature	>=	94.96	°C
			SCR Catalyst downstream temperature	<=	3003.56	°C
			battery voltage	>=	11	V
			battery voltage	<=	655.34	V
			and			
			Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
			for time	>	30	sec
			)			
			and			
			for time	>	1	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
Rail Pressure Control System Operating States		Rail Control at ECM Start	reset condition	=	TRUE	-
			or			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Rail Pre-Control (Just after start)	Rail Control at ECU Start	=	TRUE	-
			and			
			engine speed	<=	300	rpm
			and			
			(			
			rail pressure	>=	15000	kPa
			or			
			(a) - (b)	<	5000	kPa
			(a)Fuel Rail Pressure Setpoint	=	measured paramter	-
			(b)Maximum Rail Pressure for last 10ms	=	measured paramter	-
			)			
		Rail Control - PCV Closed Loop Control Only PCV = Pressure Control Valve	(			
			Rail Pressure Precontrol (Just after start)	=	TRUE	-
			and			
			Number of Crankshaft revolutions since entering Rail Pressure Precontrol	>=	10	revs
			)			
			or			
			(			
			state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			and			
			setpoint volume flow of the metering unit out of rail pressure control (see Look-Up-Table #6)	>	60000 to 224000	mm^3/rev
			or			
			(			
			Fuel system pressure and high pressure pump outlet	<	0	kPa
			and			
			engine status	=	RUNNING	-
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Rail Control - Metering Unit Closed Loop Control	state machine rail pressure control equal transitioning to metering unit pressure control mode	=	TRUE	-
			and Controller for PCV not wound-up (large corrective control)	=	TRUE	-
		Rail Control - Metering Unit + PCV Closed Loop Control	state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			and (a) + (b) (see Look-Up-Table #7)	<	12 to 400	mm^3/rev
			(a)Torque Generating fuel injection quantity	=	calculated parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
		Switchover Between Metering Unit + PCV Closed Loop Control to Metering Unit Closed Loop Control only	(			
			state machine rail pressure control equal to pressure control valve or state machine rail pressure control transitioning pressure control valve mode) and			
			(a) + (b)	<	(c) + (d)	-
			(a)Torque Generating fuel injection quantity	=	calculated parameter	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parameter	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(c) (see Look-Up-Table #7)	=	12 to 400	mm^3/rev
			(d)	=	12	mm^3/rev
			and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			or (state machine rail pressure control equal to metering unit control mode or state machine rail pressure control equal transitioning to metering unit pressure control mode) and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			(Fuel system pressure and high pressure pump outlet	<	0	kPa
			and engine status	=	RUNNING	-
			)) and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			)			
		Switchover between PCV or Metering Unit closed loop control to Metering Unit + PCV Closed Loop Control	(			
			state machine rail pressure control equal to pressure control valve	=	TRUE	-
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or			
			state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			or			
			state machine rail pressure control equal transitioning to metering unit pressure control mode	=	TRUE	-
			)			
			and			
			(			
			(			
			exhaust gas system regeneration mode	!=	REGEN	-
			)			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Switchover Between Metering Unit + PCV Closed Loop Control to PCV Closed Loop Control only	(			
			state machine rail pressure control equals coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or			
			state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			)			
			and			
			(a) + (b) (see Look-Up-Table #7)	<	12 to 400	mm^3/rev
			where			
			(a)Torque Generating fuel injection quantity	=	calculated parameter	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(b)Non-Torque generating fuel injection quantity	=	calculated parameter	-
Regeneration of the Diesel Particulate Filter		Status thermal regeneration active				
			Reduced particle mass flow in simulation by thermal regeneration			
			(a) * (b) * (c)	>	0	-
			(a) Correction factor for thermal soot burn-out dependent on lambda and oxygen mass flow (see Look-Up-Table #4)	=	0 to 4.0	factor
			(b) Effect of temperature on regenerated particle mass (see Look-Up-Table #5)	=	0 to 2.97	-
			(c) Basis value of produced soot mass flow dependent on actual soot mass (see Look-Up-Table #3)	=	0.02 to 0.29	g/sec
SCR System	NOx Control System Reductant Dosing Strategy Active State	Release of dosing of the dosing strategy				
			status of SCR control state (please see the definition)	=	Metering Control	-
			Reductant dosing is released	=	TRUE	-
			Deactivation of dosing to execute the NOx Offset test (Please see the definition)	=	FALSE	-
			since start for time	>=	0.02	sec
			gradient of exhaust gas temperature	<=	300	°C/sec
			since start for time	>=	0.01	sec
			Average temperature inside the SCR catalyst:	>	179.96	°C
			SCR catalyst wall temperature	>	89.96	°C
			Vehicle speed	>=	-0.62	mph
			engine speed	>	400	rpm
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
	NOx Control System Reductant Dosing Pressure Control System States	State of Reductant Pressure Control System: Standby	ignition	=	on	-
			Dwell time in the state of standby	<	5	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: No Pressure control	Old SCR control state (please see the definition)	=	Stand by	-
			ignition	=	on	-
			Dwell time in the state of standby	>=	5	sec
			Dwell time in the state of no pressure control	<	2	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Pressure control	Old SCR control state (please see the definition)	=	NO Pressure Control	-
			ignition	=	on	
			engine speed	>	550	rpm
			Dwell time in the state of no pressure control	>=	2	sec
			exhaust gas temperature Upstream SCR	>=	169.96	°C
			(			
			Reductant Defrost check (please see the definition)	=	TRUE	-
			or			
			The component protection release of the heater control (please see the definition)	=	TRUE	-
			or			
			Preliminary release of the heater control for the main state machine (please see the definition)	=	TRUE	-
			)			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		State of Reductant Pressure Control System: Refilling Reductant in pressure line (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			(			
			Reductant filling state in the pressure line	<	50	%
			and			
			Reductant Pump Module Pressure	<	200	kPa
			)			
			Set-point duty cycle for Reductant dosing valve	=	100	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	40.00	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Pressure build up (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			(			
			Reductant filling state in the pressure line	>=	50	%
			or			
			Reductant Pump Module Pressure	>=	200	kPa
			for time	>	0.5	sec
			)			
			Reductant Pump Module Pressure	<	350	kPa
			Set-point duty cycle for Reductant dosing valve	=	0%	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		State of Reductant Pressure Control System: Ventilation (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			Reductant Pump Module Pressure	<	350	kPa
			Dwell time in Pressure Build up substate	>	10	sec
			system pressurizes in pressure buildup and ventilation states	<	10	counts
			Set-point duty cycle for Reductant dosing valve	=	100	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%
			Dwell time in the sub state ventilation	<	0.23	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Metering control (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			Reductant Pump Module Pressure	>=	350	kPa
			Set-point duty cycle for Reductant dosing valve	=	0	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Pressure reduction	ignition	=	off	-
			dwell time in the state of pressure reduction	<	5	sec
			Activation state of Reductant reverting valve power stage	=	On	-
			Set-point duty cycle for Reductant dosing valve	=	0	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	15.00	%

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
	SCR Engine State required for operation	SCR Engine State	Ignition on	=	TRUE	-
			engine speed	>	550	rpm
	Reductant Dosing Strategy based on DPF Fload	Status fill level decrease (please see the definition)	Particulate Filter Regeneration demand on	=	TRUE	-
			or Reductant fill level of the SCR catalyst lowed to the target value under Particle filter Regeneration request (a) - (b)	>=	0	-
			(a) Nominal value of Reductant fill level in the catalyst (b) Estimated current Reductant load (c) Reductant Dosing quantity limitation	=	100	factor
			or SCR catalyst temperature too high to convert Reductant under Particle filter Regeneration request Average temperature inside the SCR catalyst:	>	999.96	°C
	Reductant Heater and Defrost System Control States and Status	Reductant Defrost check	status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec
			ambient temperature	>	-4.04	°C
			Release heater pressure line	=	FALSE	-
			and			
			duration, for which the conditions for a hydraulic release reset of supply module heater circuit are satisfied	<=	1200	sec
			ambient temperature	>	-4.04	°C
			Release heater supply module	=	FALSE	-
			)			
		Status of reductant tank heater temperature	**status of reductant tank heater temperature (please see the definition)**			
			Reductant tank heat temperature at Standby state	>	-0.04	°C
			or			
			Engine off Time	<	2147483647	sec
			Reductant tank heat temperature at Standby state	>	-9.04	°C
		State of the defrosting check of pressure line	**State of the defrosting check of pressure line (please see the definition)**			
			time since pressure line heating on under pressure line defrost mode	>=	0 to 3276.7	sec
			or			
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Pressure line defrost timer	=	0	sec
			or			
			ignition	=	on	sec
			engine speed	>	550	rpm
			(			
			Pressure line defrost check in last driving cycle	=	TRUE	-
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Engine off Time	>	0	sec
			NO Pending or Confirmed DTCs:	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		State of the defrosting check of supply module	**State of the defrosting check of supply module (please see the definition)**			
			time since supply module heating on under supply module defrost mode	>=	0 to 3276.7	sec
			or			
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Supply module defrost timer	=	0	sec
			or			
			ignition	=	on	sec
			engine speed	>	550	rpm
			(			
			Pressure line defrost check in last driving cycle	=	TRUE	-
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Engine off Time	<	0	sec
			NO Pending or Confirmed DTCs:	=	TRUE	-
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 299	sec
			Reductant Defrost check (please see the definition)	=	FALSE	-
		Preliminary release of the heater control for the main state machine	Preliminary release of the heater control for the main state machine (please see the definition)			
			(			
			Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 3276	sec
			status of reductant tank heater defrost	=	FALSE	-
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			)			
			or			
			(			
			ignition	=	on	sec
			engine speed	>	550	rpm
			Engine off Time	<=	0	sec
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			and			
			if the following conditions were met in previous driving cycle	=	TRUE	-
			(			
			ignition	=	on	sec
			engine speed	>	550	rpm
			Engine off Time	<=	0	sec
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			))			
		Release of tank heater circuit	(			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look Up-Table #17)	>=	0 to 3277	sec
			)			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Requested heating time for Reductant tank heater (see Look Up-Table #17)	>=	0 to 3277	sec
			)			
			and			
			(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look Up-Table #17)	>=	0 to 3277	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look Up-Table #17)	>=	0 to 3277	sec
			)			
			and			
			(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			))			
			and			
			NO Pending or Confirmed DTCs:	=	TRUE	-
		Release of pressure line heater circuit	(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			)			
			or			
			((			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			))			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Release of tank heater circuit	(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			)			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look Up-Table #17)	>=	0 to 3277	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			))			
			or			
			((			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look Up-Table #17)	>=	0 to 3277	sec
			)			
			and			
			(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec
			))			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Status of the battery voltage being in the valid working range for Reductant tank heater				
			battery voltage	<	100	V
			battery voltage	>	11	V
			for time	>	2	sec
		Status of the battery voltage being in the valid working range for pressure line heater				
			battery voltage	<	100	V
			battery voltage	>	11	V
			for time	>	2	sec
		Status of Reductant Tank Heater Release				
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			)			
			or			
			((			
			Waiting time before tank heater released	<	32767	sec
			started with			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			)			
			and			
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			))			
			or			
			((			
			Waiting time before tank heater released	>	32767	sec
			started with			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			)			
			and			
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			))			
	Reductant Tank Level System States and Status	status of Reductant tank level	Tank level > full (100%)	=	Full	-
			Warning (66.67%) < tank level < full (100%)	=	OK	-
			Restriction (33.33%) < tank level < Warning (66.67%)	=	Warning	-
			Empty < tank level < Restriction (33.33%)	=	Restriction	-
			Tank level < = 0.1%	=	Empty	-
		Status of Reductant tank level reset when refilling is detected (please see the definition)	(			
			time since potential Reductant refill detection is set	>=	12	sec
			and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			ignition on	=	TRUE	-
			engine speed	>	550	rpm
			Vehicle speed	>=	6.22	mph
			time since engine started	<=	(a) * (b)	
			(a) Time period for a positive slope to detect refueling	=	12	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(b) Factor for the extension of the detection time for refueling	=	20	factor
			since the following conditions met:	=	TRUE	-
			(			
			Falling edge of ignition	=	TRUE	-
			or			
			Reductant Refill enabling conditions reset timers	=	TRUE	-
			)))			
			or			
			(			
			time since potential Reductant refill detection is set	>=	8	sec
			and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-
			and with			
			(			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
			and with			
			(			
			Reductant tank Temperature	>=	-100.04	°C
			or			
			Reductant low warning level (Please see the definition)	>=	0	level
			)))			
		Status of Reductant Tank Level Release	status of reductant tank level release (please see the definition)			
			Status of Filter release for reductant tank level calculation (please see the definition)	=	TRUE	-
			and			
			((			
			ambient temperature	>=	-100.04	°C
			((			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Waiting time before tank heater released	<	32767	sec
			and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			)			
			or			
			(			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			Waiting time before tank heater released	>=	32767	sec
			and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>=	0	sec
			))			
			or			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
			)			
			Vehicle speed	>=	6.22	mph
			)			
			or			
			filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-
		Status of Filter release for reductant tank level calculation				
			Reductant tank Temperature	>=	-100.04	°C
			or			
			Reductant low warning level (Please see the definition)	>=	0	-
			NO Pending or Confirmed DTCs:	=	TRUE	-
			or			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Filter release for Reductant tank level calculation at Ignition on	ignition	=	on	-
			Engine on timer is expired (please see the definition)	=	FALSE	-
			Vehicle speed	>=	0.62	mph
			Reductant low warning level (Please see the definition)	>=	49	level
			and with			
			((			
			Raw Reductant tank level	>=	33.3	%
			and with			
			(			
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)	
			(a) Tank level for reserve mode (Restriction level) in [g]	=	2614	g
			(b) Tank level threshold range below Restriction threshold for ignition on refill detection release	=	1015	g
			)			
			or			
			Raw Reductant tank level	>=	66.7	%
			and with			
			(			
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)	
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release	=	1617	g
			)			
			or			
			Raw Reductant tank level	>=	100	%
			and with			
			(			
			Remaining Reductant quantity (a) - (b):	>=	(a) - (b)	
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release	=	1617	g
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Status of Refill detection of Reductant tank	Status of Refill detection of Reductant tank (please see the definition)			
			Reductant tank level changed	=	TRUE	-
			((			
			Captured Reductant tank level at last tank level change	=	Empty	-
			or			
			Captured Reductant tank level at last tank level change	=	Restriction	-
			)			
			and			
			(			
			one or more of following conditions are met			
			status of Reductant tank level (please see the definition)	=	Warning	-
			or			
			status of Reductant tank level (please see the definition)	=	OK	-
			or			
			status of Reductant tank level (please see the definition)	=	Full	-
			))			
			or			
			((			
			Captured Reductant tank level at last tank level change	=	Warning	-
			or			
			Captured Reductant tank level at last tank level change	=	OK	-
			)			
			and			
			(			
			status of Reductant tank level (please see the definition)	=	Full	-
			)			
			or			
			(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Captured Reductant tank level at last tank level change	=	OK	-
			status of Reductant tank level (please see the definition)	=	Full	-
			))			
		Engine on timer is expired	time since engine started	>=	(a) * (b)	sec
					12	sec
					20	-
			and with			
			((			
			ignition	=	on	sec
			engine speed	>	550	rpm
			Vehicle speed	>=	6.22	mph
			)			
			or			
			(			
			Vehicle speed	>=	6.22	mph
			NO Pending or Confirmed DTCs:	=	TRUE	
			for time	>	1	sec
			))			
			and with timer reset conditions			
			(			
			Falling edge of ignition	=	TRUE	-
			or			
			Reductant Refill enabling conditions reset timers	=	TRUE	-
			)			
	Reducant Tank Level Low Warning States	Normal_Operation_OK: 0 decimal, normal operation	Reductant tank level	=	Full	-
			and with			
			(			
			Warning level	<=	49	-
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(			
			Previous warning level	>	49	-
			vehicle speed	<=	98.75	mph
			))			
			or			
			Reductant Quality state	>	0	-
		Warning_Leve1: 1 decimal, Warning level 1	Reductant tank level	<	Full	-
			Remaining mileage	>	1558.75	miles
			and with			
			(			
			Warning level	<=	49	Warning level
			or			
			(			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			))			
			and with			
			Reductant Quality state	=	0	-
		Warning_Level2: 2 decimal, Warning level 2	Reductant tank level	<	Full	-
			Remaining mileage	<=	1558.75	miles
			and with			
			(			
			Warning level	<=	49	Warning level
			or			
			(			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and with			
			Reductant Quality state	=	0	-
		Warning_Level3: 16 decimal, Warning level 3	Reductant tank level	<	Full	-
			Remaining mileage	>	855	miles
			and with			
			(			
			Warning level	=	2	Warning level
			or			
			Warning level	=	16	Warning level
			)			
			and with			
			initialization phase after Reductant refill event is active	=	TRUE	-
			Reductant Quality state	=	0	-
		Warning_Level4: 32 decimal, Warning level 4	Reductant tank level	<	Full	-
			Remaining mileage	<=	855	miles
			and with			
			(			
			Warning level	<=	49	Warning level
			or			
			(			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			))			
			and with			
			Reductant Quality state	=	0	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Warning_Level5: 48 decimal, Warning level 5	((			
			Reductant tank level	<	Full	-
			Remaining mileage	<=	628.75	miles
			and with			
			(			
			Warning level	<=	49	Warning level
			or			
			(			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			)))			
			or			
			(			
			Warning level	=	48	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			))			
			and with			
			Reductant Quality state	=	0	-
		Warning_Level6: 49 decimal, Warning level 6	((			
			Warning level	=	49	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			)			
			or			
			(			
			Warning level	<	49	Warning level
			Failed Reductant system pressure build up	=	1	-
			))			
			and with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Reductant Quality state	=	0	-
		Warning_Level8: 80 decimal,Vehicle speed restriction mild	Warning level	=	80	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	
			and with Reductant Quality state	=	0	
		Warning_Level10: 112 decimal,Vehicle speed restriction aggressive	Warning level	=	112	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			and with Reductant Quality state	=	0	-
		Warning_Level12: 144 decimal, Vehicle speed restriction severe	Warning level	=	144	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			and with Reductant Quality state	=	0	-
		Warning_Level14: 176 decimal, Vehicle speed restriction final	Warning level	=	176	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			and with Reductant Quality state	=	0	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
	Reductant frozen System States	Frozen state is active during a certain warning level	ignition	=	On	-
			for time	>	5	sec
			Reductant tank Temperature	<=	-9.04	°C
			Reductant low warning level (Please see the definition)	>=	2	level
		Status of Reductant tank as frozen	(			
			Engine off Time	>	14400	sec
			Reductant tank Temperature	<	-11.04	°C
			)			
			or			
			(			
			Engine off Time	<=	7200	sec
			time since the following conditions are met	<=	7200	sec
			(			
			status of reductant tank heater defrost	=	On or Defrost	-
			Vehicle speed	>	6.22	mph
			Status of urea tank as frozen (please see the definition)	=	TRUE	-
			))			
	SCR System Pressure State	Status of Low Reductant Pump Pressure - Under Reductant warning level 3 - Main state 0x30	Reductant low warning level (Please see the definition)	>=	64	-
			number of pressure build-up attempts	>=	2	counts
			and			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(			
			status of SCR control sub state (please see the definition)	=	Pressure Build up	-
			Reductant Pump Module Pressure	<	350	kPa
			Dwell time in Pressure Build up substate	>	10	sec
			system pressurizes in pressure buildup and ventilation states	>=	10	counts
			Reductant Defrost check (please see the definition)	=	TRUE	-
			)			
SCR System Diagnosis	SCR System Long Term Adaptation Release States	Long-term Adaption Triggered				
			underdosing detected (please see the definition)	=	TRUE	-
			OR			
			overdosing detected (please see the definition)	=	TRUE	-
		Underdosing detected				
			Difference between the NOx mass of the sensor and of the model during first functional evaluation	>=	10	g
			OR			
			Difference between the NOx mass of the sensor and of the model during second functional evaluation	>=	10	g
			OR			
			Difference between the NOx mass of the sensor and of the model during third functional evaluation	>=	-0.25	g
		Overdosing detected				
			Difference between the NOx mass of the sensor and of the model during first functional evaluation	<=	-6	g
			OR			
			Difference between the NOx mass of the sensor and of the model during second functional evaluation	<=	-6	g
			OR			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Difference between the NOx mass of the sensor and of the model during third functional evaluation (see Look-Up-Table #9)	<=	-0.8 to -0.6	g
		Status of the SCR adaptation plausibility check active	(			
			Status of NOx signal of downstream NOx sensor (please see the definition)	=	TRUE	-
			NOx concentration downstream SCR catalyst	>	15	ppm
			for time	>	3	sec
			Estimated SCR catalyst efficiency	>	0.3	factor
			for time	>	3	sec
			NOx concentration deviation between sensor reading and modeled NOx concentration downstream SCR catalyst	>	measured parameter	-
			for time	>	10	sec
			(			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	600	sec
			or			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	50	sec
			Integrated NOx mass since Reductant load level adaptation and plausibility have been locked	>=	2	g
			)			
			Difference between nominal and estimated Reductant	<	0.125	g
			Difference between nominal and estimated Reductant	>=	-0.5	g
			Filtered Upstream NOx mass flow	>=	10	mg/sec
			Filtered Upstream NOx mass flow	<=	500	mg/sec
			(			
			Upstream Nox mass flow difference : (a) - (b)	>=	0	mg/sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Upstream Nox mass flow difference : (a) - (b) and with (a) Filtered Upstream NOx mass flow (b) Filtered actual upstream NOx mass flow)	<=	500	mg/sec
			Status of pre controlled dosing (please see the definition)	=	FALSE	-
			Difference between nominal and estimated Reductant	<	0.125	g
			Difference between nominal and estimated Reductant	>=	-0.5	g
			for time	>	5	sec
			HC load in SCR catalyst	<=	10	factor
			overall aging factor of the SCR catalyst	>=	0	factor
			for time	>	1	sec
			Temperature gradient of SCR	>=	-1	°C/sec
			Temperature gradient of SCR	<=	1	°C/sec
			for time	>	18	sec
			Integrated NOx mass flow after engine start	>=	5	g
			Release of Reductant dosing	=	active	-
			engine operating condition based on engine speed and injection quantity (see Look-Up-Table #10)	>	0 to 1	factor
			(Difference between nominal and estimated Reductant	>	-0.05	g
			Reductant mass flow (see Look-Up-Table #8)	>	0 to 0.04	g
			Elapsed time of the fill level timer)	>	20	sec
		State of the NH3 (Ammonia) slip detection	Reductant concentration downstream SCR	<	32767	ppm

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and			
			(a) - (b)	<	0	g/sec
			(a) Filtered NOx mass flow downstream SCR measured by the sensor	=	measured parameter	-
			(b) Filtered and delayed NOx raw emission mass flow upstream of SCR	=	measured parameter	-
		Deactivation of dosing to execute the NOx Offset test				
			SCR catalyst temperature	>	400.06	°C
			SCR catalyst temperature	<	999.96	°C
			time	>	60	sec
			and			
			Currently dosed Reductant mass flow	<=	0.005	g/sec
			time	>	30	sec
			and			
			Feed ratio			
			(a) / ((b) * (c))	<=	0.1	ratio
			(a) Currently dosed Reductant mass flow	=	measured parameter	-
			(b) NOx raw emission mass flow	=	measured parameter	-
			(c) Stoichiometric conversion factor NOx to Reductant	=	calculated parameter	-
			time	>	10	sec
			and			
			Estimated current Reductant load	<=	0.3	g
			time	>	10	sec
		Release plausibility of Reductant Load				
			Release plausibility timer active	>=	600	sec
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(			
			Release plausibility timer active	>=	50	sec
			Integrated NOx raw emission since fill level adaptation and plausibility have been locked	>=	2	g
			)			
		Status for disabling the SCR Efficiency monitor following an SCR Adaptation cycle completion				
			Maximum dosing quantity	<	0.6	g/sec
			or			
			(a) - (b)	>	0	-
			(a) Reductant Dosing quantity	=	measured parameter	-
			(b) Maximum Reductant Dosing quantity	=	calculated parameter	-
			or			
			(a) - (b)	>	0	
			(a) Reductant Desired value	=	calculated parameter	-
			(b) Reductant Dosing quantity limitation due to frozen tank	=	calculated parameter	-
		Request for pre controlled dosing				
			Filtered exhaust gas mass flow	>	(a) * (b)	-
			(a) Correction factor for the upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on HC-contamination	=	1	factor
			(b) Upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on thermal ageing	=	5040.00	g/sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and			
			Filtered NOx mass flow upstream SCR	>	(a) * (b)	-
			(a) Correction factor for the upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on HC-contamination SCR	=	1	factor
			(b) Upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on thermal ageing SCR	=	0.25	g/s
			and			
			Engine coolant temperature	<	(a) + (b)	-
			(a) Lower hysteresis threshold for engine temperature	=	105.06	°C
			(b) Offset for lower hysteresis switch on threshold for engine temperature	=	50	K
			Engine coolant temperature	>	108.06	°C
			and			
			ambient pressure	>	(a) + (b)	-
			(a) Upper hysteresis threshold for environment pressure	=	74.5	kPa
			(b) Offset for upper hysteresis switch on threshold for environment pressure	=	65.0	kPa
			or			
			ambient pressure	<	74.0	kPa
			and			
			Intake air temperature	>	(a) + (b)	-
			(a) Lower hysteresis switch on threshold for inlet air temperature	=	-6.54	°C
			(b) Offset for upper hysteresis switch on threshold for inlet air temperature	=	49.5	°C
			or			
			Intake air temperature	<	-8.04	°C
			)			
			and			
			(			
			ambient temperature	>=	-7.04	°C
			ambient pressure	>=	74.8	kPa

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Selected temperature used for locking pre controlled mode	>=	209.96	°C
			Selected temperature used for locking pre controlled mode	<=	309.96	°C
			engine operation in normal mode	=	TRUE	-
			SCR Nox Catalyst Efficiency check was performed this drive cycle	=	FALSE	-
			Incorrect Reductant Composition check was performed this drive cycle	=	FALSE	-
			NO Pending or Confirmed DTCs:	=	TRUE	-
			)			
			((			
			(k) + (l) + (m)	>	75	
			(k) = (a) * (b)			
			(a) entry condition for pre controlled dosing at sea level (see Look-Up-Table #13)	=	0 to 100	-
			(b) Altitude multiplier factor for sea level	=	measured paramter	-
			(l) = (c) * (d) * (e)			
			(c) entry condition for online dosing at Mid level (see Look-Up-Table #12)	=	0 to 100	-
			(d) Multiplier to Mid Level enable speed load map	=	1	factor
			(e) Altitude multiplier factor for medium altitude	=	measured paramter	-
			(m) = (f) * (g) * (h)			
			(f) Entry condition for online dosing at Hi level (see Look-Up-Table #11)	=	0 to 100	-
			(g) Multiplier to Hi Level enable speed load map	=	1	factor
			(h) Altitude multiplier factor for high altitude	=	measured paramter	-
			)			
			and			
			Low pass filtered rNOxNSCDs signal	>	2000	-
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
	Reductant Tank Heater Performance Diagnosis Status	start temperature is captured in EERPOM if monitoring is active over several driving cycles	continuation of previously started tank temperature performance monitoring cycle (see definition)	=	1.56	°C
		or				
		start temperature is captured in EERPOM if monitoring is not active over several driving cycles	(continuation of previously started tank temperature performance monitoring cycle (see definition)	=	FALSE	-
			(ignition on for time	>	60	sec
			or	=	TRUE	
			ice detection by tank temperature difference:			
			(a) - (b)	<=	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
			))			
			or			
			(a) - (b)	<=	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
			or			
			monitoring was performed in previous driving cycle			
		continuation of previously started tank temperature performance monitoring cycle	temperature difference: (a) - (b)	<=	1.56	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature of the previous driving cycle	=	measured paramter	-
			temperature difference: (a) - (b)	<=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured paramter	-
			(b) filtered current tank temperature	=	measured paramter	-
			temperature difference: (a) - (b)	>=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured paramter	-
			start tank temperature of current monitoring cycle from EEPROM (see definition)	=	measured paramter	-
			Engine off Time	<=	2000	sec
			This monitor was complete in the last driving cycle	=	FALSE	
			ice detection by tank temperature difference:			
			(a) - (b)	>	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
		State of Reductant injection valve Component Protection	((			
			status of SCR control sub state (please see the definition)	=	Metering control	-
			and with			
			(			
			PM Filter Regeneration	=	not active	-
			Modeled Reductant injection valve tip temperature based on its coil temperature (see Look-Up-Table #15)	>	100.96 to 114.96	°C
			)			
			or			
			(			
			PM Filter Regeneration	=	active	
			Reluctant dosing valve modeled temperature	>	19.96	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 12OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			))			
			or			
			(			
			status of SCR control sub state (please see the definition)	≠	Metering control	-
			and with			
			(			
			PM Filter Regeneration	=	not active	
			Modeled Reductant injection valve tip temperature based on its coil temperature (see Look-Up-Table #15)	>	100.96 to 114.96	°C
			)			
			or			
			(			
			PM Filter Regeneration	=	active	
			Modeled Reductant injection valve tip temperature based on its coil temperature	>	19.96	°C
			)))			
Turbo Charger		Turbocharger (VNT) wiping active	The Variable Nozzle Turbocharger Control has an intrusive mode where: VNT wiping is a sweep of the vane position control throughout its range of motion which is used to: avoid a binding of the VNT vanes due to soot accumulation during long idle operation with a cold engine.			

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
1	P0101	AFS_rAirThresCor_CUR

Intake Air Temperature (°C)	-100.04	-0.04	0.96	38.96	39.96	125.86
Correction Factor (factor)	0.05	0.05	0	0	0.05	0.05

2	P0101	AFS_rAirThresLo_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	950	1100	1650	2200	2750	3300	4400
4	0.75	0.75	0.8	0.8	0.8	0.8	0.8	0.8
8	0.75	0.75	0.8	0.8	0.8	0.8	0.8	0.8
14	0.75	0.75	0.8	0.8	0.8	0.8	0.8	0.8
80	0.75	0.75	0.8	0.8	0.8	0.8	0.8	0.8
120	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
240	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
280	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
380	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

3	P2263	Air_pPhysRngMinThresPIntkVUs_MAP

Injection Qty (mm^3/rev) / BARO (kPa)	60	65	70	75	82	95	100	140
0	400	450	500	550	650	750	800	1200
120	400	450	500	550	650	750	800	1200
160	450	500	550	600	700	800	850	1250
260	450	500	550	600	700	800	850	1250
280	525	575	625	675	768	875	925	1325
340	750	800	850	900	970	1100	1150	1550
480	750	800	850	900	970	1100	1150	1550
560	750	800	850	900	970	1100	1150	1550

4	P112A	Air_tDiffMaxHiTAFS_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

5	P111C	Air_tDiffMaxHiTCACDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

6	P040F	Air_tDiffMaxHiTEGRClr2Ds_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	10000	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

7	P112A	Air_tDiffMaxLoTAFS_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	20	20	20

8	P111C	Air_tDiffMaxLoTCACDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	35	35	35

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
9	P040F	Air_tDiffMaxLoTEGRClr2Ds_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	20	20	20

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
10	P0402	AirCtl_facEnvPresMaxDvt_CUR

BARO Pressure (kPa)	65	70	75	80	82.5	90	95	100
Correction Factor (factor)	2	2	2	1.833	1.75	1.3	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
11	P0401	AirCtl_facEnvPresMinDvt_CUR

BARO Pressure (kPa)	70	75	80	82.5	87.5	90	97.5	100
Correction Factor (factor)	0.6	0.6	0.6	0.8	0.867	0.9	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
12	P2413	AirCtl_facEnvPresMinDvtPwr_CUR

BARO Pressure (kPa)	50	54	58	62	66	70	75	78	82	86	90	94	97	102	106	110
Correction Factor (factor)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.364	0.45	0.597	0.743	0.89	1	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
13	P0402	AirCtl_mMaxDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	1200	1300	1400	1500	1600	1800	1850	2000
0	0.48	0.50	0.40	0.50	0.50	0.50	0.49	0.49
160	0.48	0.50	0.44	0.60	0.50	0.50	0.49	0.49
180	0.50	0.50	0.44	0.60	0.50	0.50	0.49	0.49
200	0.80	0.80	0.70	0.60	0.50	0.50	0.49	0.49
220	0.86	0.80	0.80	0.80	0.60	0.60	0.49	0.49
240	0.92	0.87	0.87	0.87	0.70	0.70	0.49	0.49
280	1.03	1.00	1.00	1.00	0.90	0.90	0.51	0.51
340	1.20	1.20	1.20	1.20	1.20	1.20	0.51	0.51

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
14	P2138	APP_uSync_CUR

Accel Pedal Voltage (V)	0.5	2.1	2.5
Pedal Deviation (V)	0.12	0.18	0.18

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
15	P026A	CAClg_dmThresHi_CUR

Vehicle Speed (mph)	25.00	75.00
Mass Air Flow (g/s)	55.56	277.78

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
16	P008F	CEngDsT_tDiffMaxHi_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32767
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
17	P008F	CEngDsT_tDiffMaxLo_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32767
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	20	20	20

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
18	**P2457**	EGRClg_etaThresCorMFl_CUR

Filtered EGR Mass Flow (g/sec)	16.67	22.22	33.33	38.89
Correction Factor (factor)	0	-0.03	-0.09	-0.12

19	**P0336**	EpmCrS_facGapPlausHigh_CA

-	8	5.8125	3.375	3.375

20	**P0336**	EpmCrS_facIncPlausHigh_CA

-	2	1.8125	1.5	1.5

21	**P12B3, P12B4, P12B5, P12B6, P12B7, P12B8, P12B9, P12BA, P12BB, P12BC, P12BD, P12BE, P12BF, P12C0, P12C1, P12C2**	ETClb_pRailSet_CA

	0	1	2
Rail Pressure Setpoint (kPa)	30000	70000	90000

22	**P12B3, P12B4, P12B5, P12B6, P12B7, P12B8, P12B9, P12BA, P12BB, P12BC, P12BD, P12BE, P12BF, P12C0, P12C1, P12C2**	ETClb_tiET_MAX_CA

	0	1	2
Energizing Time (us)	670.8	384.4	353.2

23	**P12B3, P12B4, P12B5, P12B6, P12B7, P12B8, P12B9, P12BA, P12BB, P12BC, P12BD, P12BE, P12BF, P12C0, P12C1, P12C2**	ETClb_tiETOfsMax_CA

	0	1	2
Energizing Time (us)	16	12	10

24	**P12B3, P12B4, P12B5, P12B6, P12B7, P12B8, P12B9, P12BA, P12BB, P12BC, P12BD, P12BE, P12BF, P12C0, P12C1, P12C2**	ETClb_tiETOfsMin_CA

	0	1	2
Energizing Time (us)	123.2	69.2	56

25	**P144B**	ETCtl_stPOpCtVlLopMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	900	2250	3000
0	0	1	1	1
40	0	1	1	1
120	0	1	1	1
160	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
26	P144C	ETCtl_stPOpCtVILopMin_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	900	2250	3000
0	0	1	1	1
40	0	1	1	1
120	0	1	1	1
160	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
27	P24A0	ETCtlHCl_stPOpCtVHCILopMaxInjMs_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	700	900	2250	3000
0	0	1	1	1
40	0	1	1	1
240	0	1	1	1
400	0	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
28	P24A1	ETCtlHCl_stPOpCtVHCILopMinInjMs_MAP

mm^3/hub / rpm	700	900	2250	3000
0	0	1	1	1
10	0	1	1	1
60	0	1	1	1
100	0	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
29	P11DC	Exh_facLamStatNoCat2Ds_CUR

-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
-	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
30	P11DB	Exh_facLamStatNSCDs_CUR

-	2	3	4	5	6	7	8	9	10	15	16
-	0.3	0.4	1.25	1.5	3.848	3.889	4	6.484	10	10	10

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
31	P2080, P2084, P242B, P246F	Exh_stPOpModPlausTMon_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	700	1000	1500	2000	3000	3300
0	0	0	0	0	0	0
20	255	255	255	255	255	0
40	255	255	255	255	255	0
100	255	255	255	255	255	0
200	0	255	255	255	255	0
320	0	0	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
32	P20E2	Exh_tDiffMaxHiTOxiCatDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
33	P20E2	Exh_tDiffMaxLoTOxiCatDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	30	30	30

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
34	**P0483**	FanCtl_facDiaDrvSpd_CUR

Fans Speed (rpm)	400	1523	1524	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800
factor (-)	0	0	1	1	1	1	1	1	0.9	0.8	0.7	0.6	0.4	0.2	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
35	**P0483**	FanCtl_facDiaDrvStab_CUR

Input Shaft Speed (rpm)	-1600	-1200	-700	-400	0	400	700	1200	1600
factor (-)	0	0	0.6	1	1	1	0.6	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
36	**P0483**	FanCtl_facDiaECT_CUR

ECT (°C)	-20.04	-7.04	19.96	68.96	69.96	79.96	99.96	104.96	124.96
factor (-)	0	0	0	0	0.6	0.95	1	0.95	0.9

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
37	**P0483**	FanCtl_facDiaIAT_CUR

IAT (°C)	-8.04	-7.04	-0.04	9.96	14.96	19.96	44.96	69.96	99.96
factor (-)	0	0.6	0.62	0.7	0.8	1	1	1	0.9

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
38	**P0495**	FanCtl_nDiaHiSpd_CUR

Fan Drive Speed (rpm)	400	1200	1500	1600	1800	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6800
Fan Speed (rpm)	400	1200	1450	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
39	**P0495**	FanCtl_volClthDia_CUR

Fan Drive Speed (rpm)	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600
Clutch Fluid Vol (L)	0.005	0.0055	0.006	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096	0.0115	0.011	0.011	0.0105

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
40	**P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284**	FBC_qLimNeg_MAP

ECT (°C) / Inj. Qty (mm^3/rev)	0	8	52	432	448	464	472	480
-40.04	0	0	-44	-44	-44	-44	-44	-44
103.96	0	0	-44	-44	-44	-44	-44	-44
104.96	0	0	-44	-44	-44	-44	-44	-44
105.96	0	0	-44	-44	-44	-44	-44	-44
106.96	0	0	-44	-44	-44	-44	-44	-44
107.96	0	0	-44	-44	-44	-44	-44	-44
109.96	0	0	-44	-44	-44	-44	-44	-44
134.96	0	0	-44	-44	-44	-44	-44	-44

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
41	**P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284**	FBC_qLimPos_MAP

ECT (°C) / Inj. Qty (mm^3/rev)	0	8	52	432	448	464	472	480
-40.04	0	0	44	44	44	44	44	44
103.96	0	0	44	44	44	44	44	44
104.96	0	0	44	44	44	44	44	44
105.96	0	0	44	44	44	44	44	44
106.96	0	0	44	44	44	44	44	44
107.96	0	0	44	44	44	44	44	44
109.96	0	0	44	44	44	44	44	44
134.96	0	0	44	44	44	44	44	44

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
42	P11B5	Hegn_facLamDiaFdbk_CUR

Filtered Reciprocal Lambda (-)	1	3	5	6	8	9	10	16
Reciprocal Lamda Change (-)	0.1	0.2	5	7.696	11	12.968	20	22

45	P0606	MoFCoOfs_rTrqPtdOfs_MAP

Engine Speed (rpm) / Torque (%)	0	10.156	19.922	30.078	39.844	50	60.156	69.922
840	99.609375	99.609	99.609	99.609	99.609	99.609	99.609	99.609
880	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
2000	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
3000	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
4000	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
5000	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
6000	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
7000	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719

46	P0606	MoFInjQnt_tiZFCETMax_CUR

Rail Pressure (kPa)	20000	30400	70400	90400	120000	120800
Energizing Time (us)	500	500	300	256	50	50

47	P0606	MoFInjQnt_tiZFCETMin_CUR

Rail Pressure (kPa)	20000	30400	70400	90400	120000	120800
Energizing Time (us)	-500	-500	-300	-256	-50	-50

48	P0606	MoFOvR_tiLimET_CUR

Engine Speed (rpm)	0	2000	2040	4000
Energizing Time (us)	6000	6000	200	200

49	P0299	PCR_pMaxDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	1300	1500	1600	1800	2000	2500	3000
140	17.5	17.5	17.5	17.5	20	25	25	25
160	20	20	20	20	22.5	25	25	25
200	22.5	22.5	22.5	22.5	22.5	25	25	25
240	25	25	25	22.5	25	27.5	27.5	27.5
280	27.5	27.5	27.5	27.5	27.5	28	28	28
320	30	30	30	30	30	30	30	30
360	35	35	35	35	35	35	35	35
400	40	40	40	40	40	40	40	40

50	P0234	PCR_pMinDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	1500	1600	1700	1800	2000	2500	3000
140	-12.5	-12.5	-12.5	-13.1	-13.8	-15	-30	-35
160	-12.5	-12.5	-13	-14.8	-16.5	-20	-30	-35
200	-12.5	-12.5	-15	-17.5	-20	-25	-30	-35
240	-17.5	-20	-22.5	-24.4	-26.3	-30	-30	-35
280	-20	-20	-27.5	-28.1	-28.8	-30	-30	-35
320	-20	-20	-25	-30	-30	-30	-30	-35
360	-22.5	-22.5	-27.5	-30	-30	-30	-30	-35
400	-25	-25	-30	-30	-30	-30	-30	-35

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
51	P2459	PFlt_mSotThresRgnFreq_CUR

Soot Mass Difference (g)	0	5	10	20	30	45
Soot model factor (g)	0	59	118	236	354	531

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
52	P2002	PFlt_pDiffCharMonMin_MAP

Min. Soot Mass (g) / Exhaust Vol Flow in DPF (m^3/h)	500	700	900	1300	1800	2500	3000	3250
0	0.8	1.3	1.7	2.8	4.4	7.3	9.6	10.7
5	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7
10	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7
20	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7
30	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7
50	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7
70	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7
90	0.8	1.3	1.7	2.8	4.4	7.4	9.6	10.7

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
57	P128E	Rail_pCPCFltMin_CUR

Engine Speed (rpm)	0	200	300	400	500	540	590	700	800	1000	1200	1650	2000	3000	4000	5000
Fuel Rail Pressure (kPa)	0	0	0	0	0	0	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
58	P0087	Rail_pMeUnDvtMax_CUR

Engine Speed (rpm)	0	540	590	650	1000	1200	1400	1600	1800	2000	2300	2400	3200	3400	3800	4000
Fuel Rail Pressure (kPa)	80000	80000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
59	P0088	Rail_pMeUnDvtMin_CUR

Engine Speed (rpm)	0	540	590	650	1000	1200	1400	1600	1800	2000	2300	2400	3200	3400	3800	4000
Fuel Rail Pressure (kPa)	-80000	-80000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000	-20000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
60	P128E	Rail_pMeUnFltMin_CUR

Engine Speed (rpm)	0	200	300	400	500	540	590	700	800	1000	1200	1650	2000	3000	4000	5000
Fuel Rail Pressure (kPa)	0	0	0	0	0	0	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
61	P0087	Rail_pPCVDvtMax_CUR

Engine Speed (rpm)	0	540	590	800	1000	1200	1400	1600	1800	2000	2300	2400	3200	3400	3800	4000
Fuel Rail Pressure (kPa)	80000	80000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
62	P128E	Rail_pPCVFltMin_CUR

Engine Speed (rpm)	0	200	300	400	500	540	590	700	800	1000	1200	1650	2000	3000	4000	5000
Fuel Rail Pressure (kPa)	0	0	0	0	0	0	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
63	P113A	SCR_tDiffMaxHiUCatDsT_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	30	30	30

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
68	P11CB, P11CC	SCRChk_facMaxStyNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	1100	1200	1300	1350	1400	1450	1500	1600	1650	2000
60	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
80	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
100	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
120	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
140	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
160	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
180	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
200	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
220	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
240	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
69	P11CB, P11CC	SCRChk_facMinStyNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	1100	1200	1300	1350	1400	1450	1500	1600	1650	2000
60	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
80	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
100	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
120	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
140	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
160	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
180	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
200	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
220	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05
240	0.07495117	0.075	0.075	0.075	0.075	0.05	0.05	0.05	0.05	0.05

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
71	P11CB	SCRChk_idcPOpMaxNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	600	1000	1100	1200	1300	1350	1400	1450	1500	1600	1650	2000	2200	2400	2600	3000
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
120	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
140	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
72	P11CC	SCRChk_idcPOpMinNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	600	1000	1100	1200	1300	1350	1400	1450	1500	1600	1650	2000	2200	2400	2600	3000
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
120	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
140	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
73	**P20EE, P2BAD**	SCRChk_mEstNH3LdMax_CUR

SCR Catalyst Temp (°C)	224.96	249.96	259.96	269.96	279.96	289.96	299.96	324.96
Est. Reductant Load (g)	1.85	1.7	1.5	1.4	1.3	1.2	1	0.3

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
75	**P20EE, P2BAD**	SCRChk_mEstNH3LdMin_CUR

SCR Catalyst Temp (°C)	224.96	249.96	259.96	269.96	279.96	289.96	299.96	324.96
Est. Reductant Load (g)	1.69	1.5	1.3	1.1	0.85	0.68	0.5	0.1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
77	**P20EE, P2BAD**	SCRChk_mNH3LdDvtMax_CUR

SCR Catalyst Temp (°C)	199.96	248.96	274.96	299.96	324.96	349.96	399.96	439.96
Est. Reductant Load Diff. (g)	0.2	0.2	0.2	0.18	0.15	0.15	0.08	0.05

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
79	**P11CC**	SCRChk_rNOxDiffThresBasMinUs_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	1100	1200	1300	1350	1400	1450	1500	1600	1650	2000
60	-0.69995117	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
80	-0.69995117	-0.7	-0.7	-0.7	-0.47	-0.47	-0.47	-0.7	-0.7	-0.7
100	-0.32995605	-0.33	-0.4	-0.4399	-0.47	-0.47	-0.47	-0.7	-0.7	-0.7
120	-0.32995605	-0.33	-0.4	-0.4399	-0.47	-0.47	-0.47	-0.7	-0.7	-0.7
140	-0.32995605	-0.33	-0.39	-0.42	-0.4399	-0.4399	-0.4399	-0.7	-0.7	-0.7
160	-0.32995605	-0.33	-0.39	-0.42	-0.4	-0.4	-0.4	-0.7	-0.7	-0.7
180	-0.69995117	-0.7	-0.7	-0.7	-0.37	-0.37	-0.37	-0.7	-0.7	-0.7
200	-0.69995117	-0.7	-0.7	-0.7	-0.37	-0.37	-0.37	-0.7	-0.7	-0.7
220	-0.69995117	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
240	-0.69995117	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
80	**P11CB, P11CC**	SCRChk_stExhTempRlsUsPlaus_CUR

SCR Upstream Temp (°C)	-0.04	88.96
(-)	0	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
81	**P11CB, P11CC**	SCRChk_stInjCharNOxUsPlaus_CA

	0	1	2	3	4	5	6	7
Injection Pattern (-)	24	56	58	26	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
82	**P20EE, P2BAD**	SCRChk_stPOpSelEta1_MAP

Filetered Exh Mass Flow (g/s) / SCR Upstream Temp (°C)	219.96	239.96	244.96	249.96	254.96	259.96	264.96	269.96	274.96	279.96	284.96	289.96	294.96	299.96	314.96	329.96
61.11	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
69.44	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
77.78	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
86.11	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
94.44	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
102.78	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
111.11	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
119.44	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
127.78	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
136.11	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
144.44	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
152.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
186.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
84	**P20EE, P2BAD**	SCRChk_tDeltaTempSCRMax_CUR

Filtered SCR Temp (°C)	-50.04	249.96	289.96	294.96	304.96	399.96	499.96	999.96
Delta SCR Temp (°C)	29.96	39.96	39.96	59.96	59.96	29.96	29.96	29.96

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
85	**P20EE, P2BAD**	SCRChk_tiAddDisbl_MAP

Nox Peak Duration (s) / Nox Mass Flow (g/s)	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4
0	0	0	0	0	0.1	0.2	0.3	0.4
1	0.3	0.3	0.3	0.3	0.5	1	1.5	2
2	0.5	0.5	0.5	0.5	1	2	3	4
4	1	1	1	1	2	4	6	8
6	1.5	1.5	1.5	1.5	3	6	9	12
10	2.5	2.5	2.5	2.5	5	10	15	20
20	5	5	5	5	10	20	30	40
60	5	5	5	15	30	60	90	120

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
86	**P20BA**	SCRPOD_tiUTnkTExpi_CUR

Reductant Tank Temp (°C)	-25.04	-20.04	-17.54	-15.94	-15.84	14.86	14.96	32.96
Tank Heater Activation Time (sec)	1000	1000	1200	1200	32767	32767	32767	32767

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
87	**Engine Running**	StSys_nStrtCutOut_MAP

BARO Pressure (kPa) / ECT at Start (°C)	-40.04	-20.04	-10.04	-0.04	9.96	19.96	34.96	59.96
65	850	770	755	755	755	680	600	600
70	850	770	755	755	755	680	600	600
75	850	770	755	755	755	680	600	600
80	850	770	755	755	755	680	600	600
85	850	770	755	755	755	680	600	600
90	850	770	755	755	755	680	600	600
95	834	740	720	720	720	650	600	600
100	834	740	720	720	720	650	600	600

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
88	**P2598, P2599**	TrbCh_tiDiaEnblDly_CUR

ECT (°C)	-30.04	-20.04	-0.04	9.96	19.96	39.96	59.96	79.96
Run-Time Delay (sec)	327.67	210	120	100	60	50	30	30

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
89	**P12B3, P12B4, P12B5, P12B6, P12B7, P12B8, P12B9, P12BA, P12BB, P12BC, P12BD, P12BE, P12BF, P12C0, P12C1, P12C2**	ZFC_stGearRls_CA

Gear (-)	0	1	2	3	4	5	6	7	8
-	0	0	0	1	1	1	1	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
90	**P12B3, P12B4, P12B5, P12B6, P12B7, P12B8, P12B9, P12BA, P12BB, P12BC, P12BD, P12BE, P12BF, P12C0, P12C1, P12C2**	ZFC_tiCldCham_CUR

IAT (°C)	0.06	9.96	16.86	26.86	36.86	46.86	56.86	66.86	76.86	86.86	96.86	106.86
Time (sec)	5	15	20	27	30	30	30	30	30	30	30	30

S3-12OBDG09-LGH_Specific - Calibration Tables

1 **P111D** Air_tDiffMaxHiTAFS_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Temperature Delta (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

2 **P111D** Air_tDiffMaxLoTAFS_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Temperature Delta (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	20	20	20

Calibration Parameter Definition - Calibration Tables

Status and State Calibration Tables

1 **Status of NOx signal of upstream NOx sensor** DewDet_wThresLSU0_MAP

ECT at Start (°C) / Modeled Exhaust Wall Temp (°C)	-40.14	-20.14	-10.14	-0.14	2.86	6.86	9.86	59.96	99.96	149.96
-40.14	500	500	500	500	500	500	500	375	375	375
-20.14	500	500	500	500	500	500	500	375	375	375
-10.14	500	500	500	500	500	500	500	375	375	375
-0.14	500	500	500	500	500	500	500	375	375	375
2.86	500	500	500	500	500	500	500	375	375	375
6.86	500	500	500	500	500	500	500	375	375	375
9.86	500	500	500	500	500	500	500	375	375	375
19.86	500	500	500	500	500	500	500	375	375	375
39.86	500	500	500	500	500	500	500	375	375	375
59.86	500	500	500	500	500	500	500	375	375	375

2 **Status of NOx signal of downstream NOx sensor** DewDet_wThresLSU1_MAP

ECT at Start (°C) / Modeled Exhaust Wall Temp (°C)	-40.14	-30.04	-20.04	-10.04	-0.04	19.96	39.96	59.96	89.96	109.96
-40.14	350	350	250	250	200	200	200	200	200	200
-30.04	350	350	250	200	150	150	150	150	150	150
-20.04	250	250	250	200	150	100	100	100	100	100
-10.04	200	200	200	200	150	100	100	100	100	100
-0.04	200	200	200	175	125	75	75	75	75	75
9.96	200	200	200	125	100	50	50	50	50	50
19.96	200	200	200	125	75	50	50	25	25	25
39.96	200	200	200	125	75	50	25	25	25	25
59.96	200	200	200	125	75	25	25	25	25	25
79.96	200	200	200	125	75	25	25	25	25	0

3 **Status thermal regeneration active** PFltLd_dmSotSimRgnBas_CUR

DPF Soot Mass (g)	0	10	20	30	40	50	55	60	65	70	75	80
Mass Flow (g/s)	0.02	0.03	0.07	0.10	0.14	0.18	0.20	0.22	0.24	0.25	0.27	0.29

4 **Status thermal regeneration active** PFltLd_facO2SimRgn_MAP

Exhaust Mass Flow (g/s) / Lambda (-)	1	1.2	1.35	1.5	2	2.5	3	25
0.00	0	0.62	0.98	1.26	1.91	2.31	2.58	3.78
2.78	0	0.65	1.02	1.32	2.00	2.42	2.70	3.96
5.56	0	0.65	1.02	1.32	2.00	2.42	2.70	3.96
8.33	0	0.65	1.02	1.32	2.00	2.42	2.70	3.96
11.11	0	0.69	1.07	1.39	2.10	2.54	2.83	4.00
13.89	0	0.69	1.07	1.39	2.10	2.54	2.83	4.00
25.00	0	0.69	1.07	1.39	2.10	2.54	2.83	4.00
36.11	0	0.73	1.14	1.48	2.24	2.71	3.02	4.00

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
5	**Status thermal regeneration active**	PFltLd_facTempSimRgn_CUR

Particulate Filter Surface Temp (°C)	49.96	199.96	299.96	499.96	524.96	549.96	574.96	599.96	624.96	649.96	674.96	699.96
Temperature Factor (-)	0	0	0	0.02	0.06	0.11	0.21	0.35	0.63	1.09	1.82	2.97

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
6	**Rail Control - PCV Closed Loop Control Only**	Rail_dvolMeUnCtlUpLim_CUR

Engine Speed (rpm)	0	480	2250	5000	5005	5010	5015	5020	5025	5030	5035	5040	5045	5050	5055	5060
Rail Volume Flow (mm^3/sec)	15000	15000	56000	56000	56000	56000	56000	56000	56000	56000	56000	56000	56000	56000	56000	56000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
7	**Rail Control - Metering Unit + PCV Closed Loop Control**	Rail_qMeUnCtlType_CUR

Engine Speed (rpm)	900	901	1200	1400	1600	1800	2000	4800
Injection Qty (mm^3/rev)	400	60	60	60	12	12	12	12

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
8	**Status of the SCR adaptation plausibility check active**	SCRAd_mNH3MinTrg_MAP

SCR Modeled Efficieny (-)/ SCR Temp (°C)	249.96	299.96	349.96	399.96	449.96	499.96
0	0	0	0	0.04	0.04	0.04
0.2	0	0	0	0.04	0.04	0.04
0.4	0	0	0	0.04	0.04	0.04
0.6	0	0	0	0.04	0.04	0.04
0.8	0	0	0	0.04	0.04	0.04
1	0	0	0	0.04	0.04	0.04

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
9	**Overdosing detected**	SCRAd_mNOxOvrMetPh3_CUR

SCR Avg. Temp (°C)	254.96	299.96	349.96	424.96
Nox Mass (g)	-0.6	-0.65	-0.8	-0.8

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
10	**Status of the SCR adaptation plausibility check active**	SCRAd_stSpdLd_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	0	80	100	120	160	200	240	280	320	360	400	480
600	0	0	0	1	1	1	1	1	1	1	1	1
800	0	0	0	1	1	1	1	1	1	1	1	1
900	1	1	1	1	1	1	1	1	1	1	1	1
1200	1	1	1	1	1	1	1	1	1	1	1	1
1400	1	1	1	1	1	1	1	1	1	1	1	1
1600	1	1	1	1	1	1	1	1	1	1	1	1
1800	1	1	1	1	1	1	1	1	1	1	1	1
2000	1	1	1	1	1	1	1	1	1	1	1	1
2200	1	1	1	1	1	1	1	1	1	1	1	1
2400	1	1	1	1	1	1	1	1	1	1	1	1
2800	1	1	1	1	1	1	1	1	1	1	1	1
3100	1	1	1	1	1	1	1	1	1	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
11	Request for pre controlled dosing	SCRFFC_stNQntCurrHi_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	0	40	60	80	120	160	200	240	280	320	400	480
600	0	0	0	0	0	0	100	100	100	100	100	100
1000	0	0	0	0	0	0	100	100	100	100	100	100
1200	0	0	0	0	0	0	100	100	100	100	100	100
1400	0	0	0	0	0	0	100	100	100	100	100	100
1600	0	0	0	0	0	0	0	100	100	100	100	100
1800	0	0	0	0	0	0	0	100	100	100	100	100
2000	0	0	0	0	0	0	0	100	100	100	100	100
2200	100	100	100	100	100	100	100	100	100	100	100	100
2400	100	100	100	100	100	100	100	100	100	100	100	100
2600	100	100	100	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100	100	100	100
3600	100	100	100	100	100	100	100	100	100	100	100	100

12	Request for pre controlled dosing	SCRFFC_stNQntCurrMid_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	0	40	60	80	120	160	200	240	280	320	400	480
600	0	0	0	0	0	0	100	100	100	100	100	100
1000	0	0	0	0	0	0	100	100	100	100	100	100
1200	0	0	0	0	0	0	100	100	100	100	100	100
1400	0	0	0	0	0	0	100	100	100	100	100	100
1600	0	0	0	0	0	0	0	100	100	100	100	100
1800	0	0	0	0	0	0	0	100	100	100	100	100
2000	0	0	0	0	0	0	0	100	100	100	100	100
2200	100	100	100	100	100	100	100	100	100	100	100	100
2400	100	100	100	100	100	100	100	100	100	100	100	100
2600	100	100	100	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100	100	100	100
3600	100	100	100	100	100	100	100	100	100	100	100	100

13	Request for pre controlled dosing	SCRFFC_stNQntCurrSeaLvl_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	0	40	60	80	120	160	200	240	280	320	400	480
600	0	0	0	0	0	0	100	100	100	100	100	100
1000	0	0	0	0	0	0	100	100	100	100	100	100
1200	0	0	0	0	0	0	100	100	100	100	100	100
1400	0	0	0	0	0	0	100	100	100	100	100	100
1600	0	0	0	0	0	0	0	100	100	100	100	100
1800	0	0	0	0	0	0	0	100	100	100	100	100
2000	0	0	0	0	0	0	0	100	100	100	100	100
2200	100	100	100	100	100	100	100	100	100	100	100	100
2400	100	100	100	100	100	100	100	100	100	100	100	100
2600	100	100	100	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100	100	100	100
3600	100	100	100	100	100	100	100	100	100	100	100	100

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
14	**Engine Running**	StSys_nStrtCutOut_MAP

BARO Pressure (kPa) / ECT at Start (°C)	-40.04	-20.04	-10.04	-0.04	9.96	19.96	34.96	59.96
65	850	770	755	755	755	680	600	600
70	850	770	755	755	755	680	600	600
75	850	770	755	755	755	680	600	600
80	850	770	755	755	755	680	600	600
85	850	770	755	755	755	680	600	600
90	850	770	755	755	755	680	600	600
95	834	740	720	720	720	650	600	600
100	834	740	720	720	720	650	600	600

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
15	**State of Reductant injection valve Component Protection**	UDC_tUDosVlvCoPrActv_MAP

Vehicle Speed (mph) / SCR Upstream Temp (°C)	99.96	199.96	299.96	399.96	499.96	599.96
0	104.96	104.96	104.96	104.96	103.96	100.96
12.5	114.96	114.96	114.96	113.96	107.96	102.96
31.25	114.96	114.96	114.96	114.96	111.96	104.96
37.5	114.96	114.96	114.96	114.96	114.96	111.96
62.5	114.96	114.96	114.96	114.96	114.96	111.96
93.75	114.96	114.96	114.96	114.96	114.96	111.96

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
16	**Release of tank heater circuit**	UHC_tiC1Dfrst_CUR

Reductant Tank Temp. (°C)	-35.04	-25.04	-18.04	-9.04	-8.04	-5.04	9.96	19.96
Reductant Heater Time (sec)	14400	5400	3300	2700	600	300	5	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
17	**Release of tank heater circuit**	UHC_tiC1On_CUR

Reductant Tank Temp. (°C)	-30.04	-18.04	-15.04	-11.04	-7.04	-0.04	4.96	5.06
Reductant Heater Time (sec)	3277	3277	3277	3277	600	300	300	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
18	**Release of tank heater circuit**	UHC_tiDfrstC2_CUR

Reductant Tank Temp. (°C)	-35.04	-25.04	-18.04	-9.04	-8.04	-5.04	-0.14	-0.04
Reductant Heater Time (sec)	3276.7	3276.7	3276.7	2700	600	300	200	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
19	**Release of tank heater circuit**	UHC_tiDfrstC3_CUR

Reductant Tank Temp. (°C)	-35.04	-25.04	-18.04	-9.04	-8.04	-5.04	-0.14	-0.04
Reductant Heater Time (sec)	3276.7	3276.7	3276.7	2700	600	300	200	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
20	**Release of tank heater circuit**	UHC_tiOnC2_CUR

Reductant Tank Temp. (°C)	-30.04	-18.04	-15.04	-11.04	-7.04	-0.04	4.96	5.06
Reductant Heater Time (sec)	3276.7	3276.7	3276.7	3276.7	600	300	10	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
21	**Release of tank heater circuit**	UHC_tiOnC3_CUR

Reductant Tank Temp. (°C)	-30.04	-18.04	-15.04	-11.04	-7.04	-0.04	4.96	5.06
Reductant Heater Time (sec)	3276.7	3276.7	3276.7	3276.7	600	300	10	0

This document is intended to meet the requirements documented in section 1968.2 of Title 13,
California Code of Regulations entitled Modifications to Malfunction and Diagnosis System Requirements
for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II),
paragraphs (i)(2.2) for a table detailing **supplemental** calibration parameter data for OBD II Group 12OBDG09.

Inhibit Matrix for Diagnostic System Manager

Revised 1/21/2011
SW Step V040 - 99%

Active DTC	Inhibited DTCs								
P0016 - Crankshaft to Camshaft Correlation	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0045 - Turbocharger Boost Control Circuit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P0047 - Turbocharger Boost Control Circuit Low Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P0048 - Turbocharger Boost Control Circuit High Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P006E - Turbocharger Boost High Control Circuit Low Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P006F - Turbocharger Boost High Control Circuit High Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2510 - ECM Power Relay Circuit Performance				
P007C - CAC Temperature Sensor Circuit Low Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	
P007D - CAC Temperature Sensor Circuit High Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	
P008F - Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible	P0101 - Mass Air Flow Sensor Performance								
P0097 - Intake Air Temperature Sensor 2 Circuit Low	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance					
P0098 - Intake Air Temperature Sensor 2 Circuit High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance					
P00CA - Fuel Pressure Regulator 1 High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance								
P0101 - Mass Air Flow Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance
	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P0102 - Mass Air Flow Sensor Circuit Low	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0103 - Mass Air Flow Sensor Circuit High	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0106 - Manifold Absolute Pressure Sensor Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive				
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	P0101 - Mass Air Flow Sensor Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P2263 - Turbo Boost System Performance
	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance							
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	P0101 - Mass Air Flow Sensor Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P2263 - Turbo Boost System Performance
	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance							
P0112 - Intake Air Temperature Sensor 1 Circuit Low	P0101 - Mass Air Flow Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0113 - Intake Air Temperature Sensor 1 Circuit High	P0101 - Mass Air Flow Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0117 - Engine Coolant Temperature Sensor Circuit Low	P0106 - Manifold Absolute Pressure Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
	P0281 - Cly 7 Balance System	P0284 - Cly 8 Balance System	P0299 - Turbocharger Engine Underboost	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected
	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance
	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance							
P0118 - Engine Coolant Temperature Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
	P0281 - Cly 7 Balance System	P0284 - Cly 8 Balance System	P0299 - Turbocharger Engine Underboost	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected				
	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive
	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance			
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0101 - Mass Air Flow Sensor Performance								
P0192 - Fuel Rail Pressure Sensor Circuit Low	P0191 - Fuel Rail Pressure Sensor Performance								
P0193 - Fuel Rail Pressure Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance								
P0234 - Turbocharger Engine Overboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							

Active DTC	Inhibited DTCs								
P0299 - Turbocharger Engine Underboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P02E0 - Intake Air Flow Valve Control Circuit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P2510 - ECM Power Relay Circuit Performance			
P02E7 - Diesel Intake Air Flow Position Sensor Circuit Range Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive							
P02E8 - Diesel Intake Air Flow Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P02E9 - Diesel Intake Air Flow Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P02EB - Intake Air Flow Valve Control Motor Current Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit				
P0335 - Crankshaft Position Sensor Circuit	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High			
P0336 - Crankshaft Position Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High			
P0340 - Camshaft Position Sensor Circuit	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0341 - Camshaft Position Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0400 - Exhaust Gas Recirculation (EGR) Flow Incorrect	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P0401 - Exhaust Gas Recirculation Flow Insufficient	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High
P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High
P0403 - Exhaust Gas Recirculation (EGR) Motor Control Circuit	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance
	P246F - Exhaust Temperature Sensor 4 Performance	P2510 - ECM Power Relay Circuit Performance							
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P040C - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit Low Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P040D - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit High Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P041C - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit Low Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P041D - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit High Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P046C - Exhaust Gas Recirculation(EGR) Position Sensor Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature					
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature					
P0575 - Cruise Control Input Circuit	P0567 - Cruise Control Resume Switch Circuit	P0568 - Cruise Control Set Switch Circuit							
P057C - Brake Pedal Position Sensor Circuit High Voltage	P057D - Brake Pedal Position Sensor Circuit Low Voltage								
P057D - Brake Pedal Position Sensor Circuit Low Voltage	P057C - Brake Pedal Position Sensor Circuit High Voltage								
P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1	P2149 - Injector Positive Voltage Control Circuit Group 2	P2152 - Injector Positive Voltage Control Circuit Group 3	P2155 - Injector Positive Voltage Control Circuit Group 4					
P064C - Glow Plug Control Module Performance	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1							
P0651 - 5 Volt Reference 2 Circuit	P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage							
P0697 - 5 Volt Reference 3 Circuit	P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P2123 - Accelerator Pedal Position Sensor 1 Circuit High							
P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage								
P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage								

Active DTC	Inhibited DTCs					
P1044 - Reductant Pump High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance					
P1046 - Reductant Purge Valve High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance					
P1048 - Reductant Injector High Control Circuit Low Voltage	P202E - Reductant Injector Performance					
P1049 - Reductant Injector High Control Circuit High Voltage	P202E - Reductant Injector Performance	P2510 - ECM Power Relay Circuit Performance				
P10CE - Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance					
P111C - Charge Air Cooler Temperature-Intake Air Temperature (IAT) Sensor 2 Not Plausible	P0101 - Mass Air Flow Sensor Performance	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	
P112A - Intake Air Temperature (IAT) Sensor 1 - Fuel Temperature Sensor 1 Not Plausible	P0101 - Mass Air Flow Sensor Performance	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	
P113A - Exhaust Gas Temperature Sensors 3-4 Not Plausible	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance				
P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High				
P11DC - NOx Sensor Current Performance Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High				
P1224 - Injector 1 Control Circuit Shorted	P0201 - Injector 1 Control Circuit	P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1			
P1227 - Injector 2 Control Circuit Shorted	P0202 - Injector 2 Control Circuit	P0606 - Control Module Internal Performance	P2152 - Injector Positive Voltage Control Circuit Group 3			
P122A - Injector 3 Control Circuit Shorted	P0203 - Injector 3 Control Circuit	P0606 - Control Module Internal Performance	P2155 - Injector Positive Voltage Control Circuit Group 4			
P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive		
P1233 - Injector 4 Control Circuit Shorted	P0204 - Injector 4 Control Circuit	P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1			
P1236 - Injector 5 Control Circuit Shorted	P0205 - Injector 5 Control Circuit	P0606 - Control Module Internal Performance	P2152 - Injector Positive Voltage Control Circuit Group 3			
P1239 - Injector 6 Control Circuit Shorted	P0206 - Injector 6 Control Circuit	P0606 - Control Module Internal Performance	P2149 - Injector Positive Voltage Control Circuit Group 2			
P1242 - Injector 7 Control Circuit Shorted	P0207 - Injector 7 Control Circuit	P0606 - Control Module Internal Performance	P2149 - Injector Positive Voltage Control Circuit Group 2			
P1247 - Injector 8 Control Circuit Shorted	P0208 - Injector 8 Control Circuit	P0606 - Control Module Internal Performance	P2155 - Injector Positive Voltage Control Circuit Group 4			
P125B - Fuel Pressure Regulator 2 High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance					
P140B - Exhaust Gas Recirculation Slow Response-Increasing Flow	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High		
P140C - Exhaust Gas Recirculation Slow Response-Decreasing Flow	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High		
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned
P1414 - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit			
P163C - Glow Plug Control Module Primary Circuit	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1				
P16A0 - Throttle Sensor Communication Circuit Low Voltage	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit			
P16A1 - Throttle Sensor Communication Circuit High Voltage	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit			
P16A2 - Throttle Sensor Communication Circuit Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit			
P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2459 - Diesel Particulate Filter Regeneration Frequency					
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	
P2033 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	
P2047 - Reductant Injector Control Circuit	P202E - Reductant Injector Performance					
P2048 - Reductant Injector Control Circuit Low Voltage	P202E - Reductant Injector Performance					
P2049 - Reductant Injector Control Circuit High Voltage	P202E - Reductant Injector Performance	P2510 - ECM Power Relay Circuit Performance				
P204B - Reductant Pump Pressure Sensor Performance	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High			
P204C - Reductant Pump Pressure Sensor Circuit Low	P204B - Reductant Pump Pressure Sensor Performance	P20A1 - Reductant Purge Valve Performance				
P204D - Reductant Pump Pressure Sensor Circuit High	P204B - Reductant Pump Pressure Sensor Performance	P20A1 - Reductant Purge Valve Performance				

Active DTC	Inhibited DTCs								
P205C - Reductant Tank Temperature Sensor Circuit Low	P20BA - Reductant Heater 1 Performance								
P205D - Reductant Tank Temperature Sensor Circuit High	P205B - Reductant Tank Temperature Sensor Performance	P20BA - Reductant Heater 1 Performance							
P208A - Reductant Pump Control Circuit	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High					
P208D - Reductant Pump Control Circuit High Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High	P2510 - ECM Power Relay Circuit Performance				
P20A0 - Reductant Purge Valve Control Circuit	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High					
P20A2 - Reductant Purge Valve Control Circuit Low Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High					
P20A3 - Reductant Purge Valve Control Circuit High Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High	P2510 - ECM Power Relay Circuit Performance				
P20CB - Exhaust Aftertreatment Fuel Injector Control Circuit	P2510 - ECM Power Relay Circuit Performance								
P20CE - Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance								
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P0101 - Mass Air Flow Sensor Performance	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance				
P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation								
P2123 - Accelerator Pedal Position Sensor 1 Circuit High	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation								
P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation								
P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation								
P2146 - Injector Positive Voltage Control Circuit Group 1	P0606 - Control Module Internal Performance								
P2149 - Injector Positive Voltage Control Circuit Group 2	P0606 - Control Module Internal Performance								
P2152 - Injector Positive Voltage Control Circuit Group 3	P0606 - Control Module Internal Performance								
P2155 - Injector Positive Voltage Control Circuit Group 4	P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1	P2149 - Injector Positive Voltage Control Circuit Group 2	P2152 - Injector Positive Voltage Control Circuit Group 3					
P2200 - N0x Sensor Circuit Bank 1 Sensor 1	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P2202 - N0x Sensor Circuit Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P2203 - N0x Sensor Circuit High Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P2205 - N0x Heater Control Circuit Bank 1 Sensor 1	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P2209 - N0x Heater Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P220A - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 1	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1							
P220B - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 2	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1							
P2228 - Barometric Pressure Sensor Circuit Low	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2080 - Exhaust Temperature Sensor 1 Performance
	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						
P2229 - Barometric Pressure Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2080 - Exhaust Temperature Sensor 1 Performance
	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance					
P2263 - Turbo Boost System Performance	P0101 - Mass Air Flow Sensor Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive			
P229E - NOx Sensor Circuit Bank 1 Sensor 2	P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P229F - NOx Sensor Performance Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P22A3 - NOx Heater Control Circuit Bank 1 Sensor 2	P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P22A7 - NOx Heater Performance Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P2413 - Exhaust Gas Recirculation (EGR) System Performance	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					

Active DTC	Inhibited DTCs								
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						
P242D - Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						
P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2459 - Diesel Particulate Filter Regeneration Frequency			
P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2459 - Diesel Particulate Filter Regeneration Frequency					
P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2459 - Diesel Particulate Filter Regeneration Frequency					
P245A - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	P2510 - ECM Power Relay Circuit Performance	
P2463 - Diesel Particulate Filter - Soot Accumulation	P2002 - Diesel Particulate Filter (DPF) Low Efficiency								
P2470 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit Low Voltage	P2428 - Exhaust Gas High Temperature	P246F - Exhaust Temperature Sensor 4 Performance							
P2471 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	P2428 - Exhaust Gas High Temperature	P246F - Exhaust Temperature Sensor 4 Performance							
P2493 - EGR Cooler BY Pass Position Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive							
P2494 - EGR Cooler BY Pass Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P2495 - EGR Cooler BY Pass Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P2564 - Turbocharger Boost Control Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P2565 - Turbocharger Boost Control Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P2598 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	P0101 - Mass Air Flow Sensor Performance								
P2599 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	P0101 - Mass Air Flow Sensor Performance								
U0073 - CAN A BUS OFF	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							
U0101 - Lost Communications With Transmission Control System	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							
U0106 - Lost Communication With Glow Plug Control Module	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High						
U029D - N0x 1 loss of comm	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
U029E - N0x 2 loss of comm	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High						

This document is intended to meet the requirements documented in section 1968.2 of Title 13, California Code of Regulations entitled Modifications to Malfunction and Diagnosis System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II), paragraphs (i)(2.2) for a table detailing **supplemental** calibration parameter data for OBD II Group 12OBDG09.

Disable Matrix for Diagnostic System Manager

DTC	Additional Basic Enable Conditions								
P0016 - Crankshaft to Camshaft Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P003A - Turbocharger Boost Control Position Not Learned	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P0045 - Turbocharger Boost Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P0047 - Turbocharger Boost Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P0048 - Turbocharger Boost Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P006E - Turbocharger Boost High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P006F - Turbocharger Boost High Control Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)								
P007C - CAC Temperature Sensor Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P007D - CAC Temperature Sensor Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0087 - Fuel Rail Pressure Too Low	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0088 - Fuel Rail Pressure Too High	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P008F - Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0090 - Fuel Pressure Regulator 1 Control Circuit/Open	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P0091 - Fuel Pressure Regulator 1 Control Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P0092 - Fuel Pressure Regulator 1 Control Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P0097 - Intake Air Temperature Sensor 2 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0098 - Intake Air Temperature Sensor 2 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P00C9 - Fuel Pressure Regulator 1 High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P00CA - Fuel Pressure Regulator 1 High Control Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)								
P0101 - Mass Air Flow Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0102 - Mass Air Flow Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0103 - Mass Air Flow Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0106 - Manifold Absolute Pressure Sensor Performance	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0112 - Intake Air Temperature Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0113 - Intake Air Temperature Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0117 - Engine Coolant Temperature Sensor Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0118 - Engine Coolant Temperature Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0137 - HO2S Bank 1 Sensor 2 circuit low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0138 - HO2S Bank 1 Sensor 2 circuit high	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0182 - Fuel Temperature Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0183 - Fuel Temperature Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0191 - Fuel Rail Pressure Sensor Performance	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								

DTC	Additional Basic Enable Conditions									
P0192 - Fuel Rail Pressure Sensor Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P0193 - Fuel Rail Pressure Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P0234 - Turbocharger Engine Overboost	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0263 - Cly 1 Balance System	Power Take-Off (PTO) is not engaged									
P0266 - Cly 2 Balance System	Power Take-Off (PTO) is not engaged									
P0269 - Cly 3 Balance System	Power Take-Off (PTO) is not engaged									
P026A - CAC Effieciency Below Threshold	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0272 - Cly 4 Balance System	Power Take-Off (PTO) is not engaged									
P0275 - Cly 5 Balance System	Power Take-Off (PTO) is not engaged									
P0278 - Cly 6 Balance System	Power Take-Off (PTO) is not engaged									
P0281 - Cly 7 Balance System	Power Take-Off (PTO) is not engaged									
P0284 - Cly 8 Balance System	Power Take-Off (PTO) is not engaged									
P0299 - Turbocharger Engine Underboost	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P02E0 - Intake Air Flow Valve Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P02E2 - Intake Air Flow Valve Control Circuit 1 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P02E3 - Intake Air Flow Valve Control Circuit 1 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P02E7 - Diesel Intake Air Flow Position Sensor Circuit Range Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P02E8 - Diesel Intake Air Flow Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P02E9 - Diesel Intake Air Flow Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P02EB - Intake Air Flow Valve Control Motor Current Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P0300 - Engine Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0301 - Cylinder 1 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0302 - Cylinder 2 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0303 - Cylinder 3 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0304 - Cylinder 4 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0305 - Cylinder 5 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0306 - Cylinder 6 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0307 - Cylinder 7 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0308 - Cylinder 8 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0335 - Crankshaft Position Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0336 - Crankshaft Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0340 - Camshaft Position Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0341 - Camshaft Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0381 - Wait to Start Lamp Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm						
P0400 - Exhaust Gas Recirculation (EGR) Flow Incorrect	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0401 - Exhaust Gas Recirculation Flow Insufficient	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0402 - Exhaust Gas Recirculation Flow Excessive	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0403 - Exhaust Gas Recirculation (EGR) Motor Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P040C - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P040D - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					

DTC	Additional Basic Enable Conditions							
P041C - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P041D - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0461 - Fuel Level Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0462 - Fuel Level Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0463 - Fuel Level Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P046C - Exhaust Gas Recirculation(EGR) Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0480 - Cooling Fan Speed Output Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P0483 - Cooling Fan System Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0489 - Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0490 - Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0495 - Cooling Fan Speed High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P049D - EGR Control Position Not Learned	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0506 - Idle Speed Low	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0507 - Idle Speed High	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0526 - Cooling Fan Speed Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0567 - Cruise Control Resume Switch Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0568 - Cruise Control Set Switch Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0575 - Cruise Control Input Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0606 - Control Module Internal Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P062F - Control Module Long Term Memory Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0640 - Intake Air (IA) Heater Switch/Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0641 - 5 Volt Reference 1 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P064C - Glow Plug Control Module Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0650 - Malfunction Indicator Lamp Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P0651 - 5 Volt Reference 2 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0671 - Glow Plug 1 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0672 - Glow Plug 2 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0673 - Glow Plug 3 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0674 - Glow Plug 4 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0675 - Glow Plug 5 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0676 - Glow Plug 6 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0677 - Glow Plug 7 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0678 - Glow Plug 8 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0697 - 5 Volt Reference 3 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						

DTC	Additional Basic Enable Conditions										
P06A3 - 5 Volt Reference 4 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s									
P06D2 - 5 Volt Reference 5 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s									
P0700 - Transmission Control Module Requested Malfunction Indicator Lamp Illumination	engine is not in standby state (standby state occurs after ECM initialization or following after-run)										
P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)										
P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)										
P0856 - Traction Control Torque Request Signal Message Counter Incorrect	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)								
P1043 - Reductant Pump High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P1044 - Reductant Pump High Control Circuit High Voltage	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P1048 - Reductant Injector High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P1049 - Reductant Injector High Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P10CC - Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm							
P10CD - Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm							
P10CE - Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm							
P111C - Charge Air Cooler Temperature-Intake Air Temperature (IAT) Sensor 2 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P111D - Intake Air Temperature (IAT) Sensor 1 - Fuel Temperature Sensor 2 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P113A - Exhaust Gas Temperature Sensors 3-4 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P11B5 - HO2S Current Performance Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P11DC - NOx Sensor Current Performance Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P122C - Intake Air Flow Valve Control Circuit Shorted	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s									
P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s									
P122E - Intake Air Flow Valve Control Circuit 2 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s									
P122F - Intake Air Flow Valve Control Circuit 2 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s									
P125A - Fuel Pressure Regulator 2 High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm							
P125B - Fuel Pressure Regulator 2 High Control Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)										
P128E - Fuel Rail Pressure Performance	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)										
P12B3 - Cylinder 1 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12B4 - Cylinder 1 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12B5 - Cylinder 2 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12B6 - Cylinder 2 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12B7 - Cylinder 3 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12B8 - Cylinder 3 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12B9 - Cylinder 4 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P12BA - Cylinder 4 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								

DTC	Additional Basic Enable Conditions									
P12BB - Cylinder 5 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12BC - Cylinder 5 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12BD - Cylinder 6 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12BE - Cylinder 6 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12BF - Cylinder 7 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12C0 - Cylinder 7 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12C1 - Cylinder 8 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P12C2 - Cylinder 8 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P1407 - Exhaust Gas Recirculation (EGR) Motor Control Circuit Shorted	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P140B - Exhaust Gas Recirculation Slow Response-Increasing Flow	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P140C - Exhaust Gas Recirculation Slow Response-Decreasing Flow	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P140D - Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P140E - Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P1411 - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 2 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P1412 - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 2 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P1413 - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit Shorted	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P1414 - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P144B - Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P144C - Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P150C - TCM Engine Speed Request Signal Message Counter Incorrect	engine is not in standby state (standby state occurs after ECM initialization or following after-run)									
P1591 - Body Control Module Engine Speed Request Signal Message Counter Incorrect	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P160C - Engine Calibration Information Not Programed In The Control Module	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s								
P161A - Glow Plug Control Module Not Programed	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P163C - Glow Plug Control Module Primary Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P163D - Glow Plug Control Module Secondary Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P163E - Glow Plug Control ModuleOvertemperature	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P166B - Intake Air (IA) Heater Over Temperature	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P16A0 - Throttle Sensor Communication Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P16A1 - Throttle Sensor Communication Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P16A2 - Throttle Sensor Communication Circuit Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2002 - Diesel Particulate Filter (DPF) Low Efficiency	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P202E - Reductant Injector Performance	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P2033 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P203B - Reductant Level Sensor 1 Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		

DTC	Additional Basic Enable Conditions								
P203C - Reductant Level Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P203D - Reductant Level Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2047 - Reductant Injector Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2048 - Reductant Injector Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2049 - Reductant Injector Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P204B - Reductant Pump Pressure Sensor Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)								
P204C - Reductant Pump Pressure Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P204D - Reductant Pump Pressure Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)								
P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P205B - Reductant Tank Temperature Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P205C - Reductant Tank Temperature Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P205D - Reductant Tank Temperature Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P207F - Nox Sensor Bank 1 Sensor 2 Performance	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2080 - Exhaust Temperature Sensor 1 Performance	Engine speed greater than 600 to 850 rpm	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P2084 - Exhaust Temperature Sensor 2 Performance	Engine speed greater than 600 to 850 rpm	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P208A - Reductant Pump Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P208B - Reductant Pump Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C					
P208D - Reductant Pump Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P20A0 - Reductant Purge Valve Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P20A1 - Reductant Purge Valve Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20A2 - Reductant Purge Valve Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P20A3 - Reductant Purge Valve Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P20B9 - Reductant Heater 1 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BA - Reductant Heater 1 Performance	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P20BB - Reductant Heater 1 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BC - Reductant Heater 1 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BD - Reductant Heater 2 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BF - Reductant Heater 2 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C0 - Reductant Heater 2 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C1 - Reductant Heater 3 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C3 - Reductant Heater 3 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C4 - Reductant Heater 3 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20CB - Exhaust Aftertreatment Fuel Injector Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P20CC - Exhaust Aftertreatment Fuel Injector Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P20CD - Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P20CE - Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					

DTC	Additional Basic Enable Conditions									
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P21AA - Reductant Level Sensor 2 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P21AB - Reductant Level Sensor 2 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P21AF - Reductant Level Sensor 3 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P21B0 - Reductant Level Sensor 3 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2200 - N0x Sensor Circuit Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2201 - N0x Sensor Performance Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2202 - N0x Sensor Circuit Low Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2203 - N0x Sensor Circuit High Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2205 - N0x Heater Control Circuit Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2209 - N0x Heater Performance Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P220A - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 1	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P220B - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 2	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P2228 - Barometric Pressure Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2229 - Barometric Pressure Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2263 - Turbo Boost System Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2295 - Fuel Pressure Regulator 2 Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm						
P2296 - Fuel Pressure Regulator 2 Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm						
P229E - NOx Sensor Circuit Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P229F - NOx Sensor Performance Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P22A0 - NOx Sensor Circuit Low Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P22A1 - NOx Sensor Circuit High Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P22A3 - NOx Heater Control Circuit Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P22A7 - NOx Heater Performance Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2413 - Exhaust Gas Recirculation (EGR) System Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P242B - Exhaust Temperature Sensor 3 Performance	Engine speed greater than 600 to 850 rpm	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P242D - Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2457 - Exhaust Gas (EGR) Cooler Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2459 - Diesel Particulate Filter Regeneration Frequency	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa								

DTC	Additional Basic Enable Conditions									
P245A - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P245C - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P245D - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P2463 - Diesel Particulate Filter - Soot Accumulation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P246F - Exhaust Temperature Sensor 4 Performance	Engine speed greater than 600 to 850 rpm	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P2470 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P2471 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P2493 - EGR Cooler BY Pass Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2494 - EGR Cooler BY Pass Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2495 - EGR Cooler BY Pass Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P24A0 - Closed Loop Particulate Filter Regeneration Control At Limit Temperature Too Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P24A1 - Closed Loop Particulate Filter Regeneration Control At Limit Temperature Too High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P2510 - ECM Power Relay Circuit Performance	battery voltage is above 11 V for at least 3s									
P2564 - Turbocharger Boost Control Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2565 - Turbocharger Boost Control Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2598 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P2599 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P2610 - Control Module Ignition Off Timer Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P268A - Fuel Injector Calibration Not Programmed ECM	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P268C - Cylinder 1 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P268D - Cylinder 2 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P268E - Cylinder 3 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P268F - Cylinder 4 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P2690 - Cylinder 5 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P2691 - Cylinder 6 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P2692 - Cylinder 7 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P2693 - Cylinder 8 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)									
P2771 - 4wd Low Switch Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
U0073 - CAN A BUS OFF	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
U0074 - CAN B BUS OFF	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
U0101 - Lost Communications With Transmission Control System	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
U0106 - Lost Communication With Glow Plug Control Module	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
U010E - Lost Communications With Reductant Control Module	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
U029D - N0x 1 loss of comm	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm						
U029E - N0x 2 loss of comm	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm						