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	Engine backward rotation detected	= FALSE -	fail conditions exists for more than 2 events test performed continuously 0.01 s rate	B
			OR		and			
			average value of camshaft offset	> 20.00 degrees	NO pending or confirmed DTCs	= see sheet inhibit tables -		
					and			
					Ignition ON	= TRUE -		
					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:**		injection quantity	>= 0.00 mm^3/rev	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 closed valve position	< 68.01 %	and			
			or		injection quantity	<= 100.00 mm^3/rev		
			mean offset learned value at fully closed valve position	> 95.61 %	and			
					accelerator pedal position	<= 0.10 %		
					and			
					Engine Speed	>= 500.00 rpm		
					and			
					Engine Speed	<= 760.00 rpm		
					and			
					Vehicle speed	>= 0.00 mph		
					and			
					Vehicle speed	<= 3.11 mph		
					and			
					Battery voltage	>= 10.00 V		
					and			
					engine coolant temperature	>= 71.96 °C		
					and			
					engine coolant temperature	<= 99.96 °C		
					and			
					Barometric pressure	>= 65.00 kPa		
					and			
					Barometric pressure	<= 110.00 kPa		
					and			
					time since start	> 10.08 sec		
					and			
					Engine is Idling	= TRUE -		
					and			
					Rich idle regeneration	= inactive -		
					and			
					Rich idle	= inactive -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Adaption is finished for this driving cycle	=	FALSE	-		
					and					
					turbocharger offset adaption timer	>=	0.60	sec		
					and					
					mean offset learned value at fully open valve position	>=	5.54	%		
					and					
					mean offset learned value at fully open valve position	<=	36.94	%		
					and					
					valve closed	=	TRUE			
					and					
					turbocharger offset adaption timer	>=	0.15	sec		
					and					
					No Pending or confirmed DTCs	=	see sheet inhibit tables	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
			Path 2: time taken to learn the mean offset learned value at fully closed valve position	> 30.00 sec	injection quantity	>=	0.00	mm^3/rev	fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	
					and					
					injection quantity	<=	100.00	mm^3/rev		
					and					
					accelerator pedal position	<=	0.10	%		
					and					
					Engine Speed	>=	500.00	rpm		
					and					
					Engine Speed	<=	760.00	rpm		
					and					
					Vehicle speed	>=	0.00	mph		
					and					
					Vehicle speed	<=	3.11	mph		
					and					
					Battery voltage	>=	10.00	V		
					and					
					engine coolant temperature	>=	71.96	°C		
					and					
					engine coolant temperature	<=	130.06	°C		
					and					
					Barometric pressure	>=	65.00	kPa		
					and					
					Barometric pressure	<=	110.00	kPa		
					and					
					time since start	>	10.08	sec		
					and					
					Engine is Idling	=	TRUE	-		
					and					
					Rich idle regeneration	=	inactive	-		
					and					
					Rich idle	=	inactive	-		
					and					
					Adaption is finished for this driving cycle	=	FALSE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							turbocharger offset adaption timer	>=	0.60	sec		
							and					
							mean offset learned value at fully open valve position	>=	5.54	%		
							and					
							mean offset learned value at fully open valve position	<=	36.94	%		
							and					
							valve closed	=	TRUE			
							and					
							turbocharger offset adaption timer	>=	0.15	sec		
							and					
							No Pending or confirmed DTCs	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			Path 3:				injection quantity	>=	0.00	mm^3/rev	fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	
			mean offset learned value at fully open valve position	<	5.54	%	and					
			or				injection quantity	<=	100.00	mm^3/rev		
			mean offset learned value at fully open valve position	>	36.94	%	and					
							accelerator pedal position	<=	0.10	%		
							and					
							Engine Speed	>=	500.00	rpm		
							and					
							Engine Speed	<=	760.00	rpm		
							and					
							Vehicle speed	>=	0.00	mph		
							and					
							Vehicle speed	<=	3.11	mph		
							and					
							Battery voltage	>=	10.00	V		
							and					
							engine coolant temperature	>=	71.96	°C		
							and					
							engine coolant temperature	<=	130.06	°C		
							and					
							Barometric pressure	>=	65.00	kPa		
							and					
							Barometric pressure	<=	110.00	kPa		
							and					
							time since start	>	10.08	sec		
							and					
							Engine is Idling	=	TRUE	-		
							and					
							Rich idle regeneration	=	inactive	-		
							and					
							Rich idle	=	inactive	-		
							and					
							Adaption is finished for this driving cycle	=	FALSE	-		
							and					
							valve closed	=	TRUE	-		
							and					
							turbocharger offset adaption timer	>=	0.60	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							turbocharger offset adaption timer	>=	0.15	sec		
							and					
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			Path 4: time taken to learn the mean offset learned value at fully open valve position	>	30.00	sec	injection quantity	>=	0.00	mm^3/rev	fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	
							and					
							injection quantity	<=	100.00	mm^3/rev		
							and					
							accelerator pedal position	<=	0.10	%		
							and					
							Engine Speed	>=	500.00	rpm		
							and					
							Engine Speed	<=	760.00	rpm		
							and					
							Vehicle speed	>=	0.00	mph		
							and					
							Vehicle speed	<=	3.11	mph		
							and					
							Battery voltage	>=	10.00	V		
							and					
							engine coolant temperature	>=	71.96	°C		
							and					
							engine coolant temperature	<=	130.06	°C		
							and					
							Barometric pressure	>=	65.00	kPa		
							and					
							Barometric pressure	<=	110.00	kPa		
							and					
							time since start	>	10.08	sec		
							and					
							Engine is Idling	=	TRUE	-		
							and					
							Rich idle regeneration	=	inactive	-		
							and					
							Rich idle	=	inactive	-		
							and					
							Adaption is finished for this driving cycle	=	FALSE	-		
							and					
							valve closed	=	TRUE	-		
							and					
							turbocharger offset adaption timer	>=	0.60	sec		
							and					
							turbocharger offset adaption timer	>=	0.15	sec		
							and					
							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.
Turbocharger Boost Control Circuit	P0045	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit: ≥ 200 K Ω impedance between ECU pin and load -	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Diagnoses the Turbocharger Boost Control low side driver circuit for driver over temperature faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded		battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
Turbocharger Boost Control Circuit Low Voltage	P0047	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 3 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.
Turbocharger Boost Control Circuit High Voltage	P0048	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	B
Turbocharger Boost High Control Circuit Low VoltageTurbocharger Boost Control Circuit High Voltage	P006E	Diagnoses the Turbo Charger Boost Circuit high side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 1.5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
Turbocharger Boost High Control Circuit High Voltage	P006F	Diagnoses the Turbo Charger Boost Circuit high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 0.1 s 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.
CAC Temperature Sensor Circuit Low Voltage	P007C	Detects a CAC temperature sensor circuit short to ground.	CAC downstream temperature sensor voltage	<	0.11	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	A
			same as downstream CAC temperature	>	150	°C	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
CAC Temperature Sensor Circuit High Voltage	P007D	Detects a CAC temperature sensor circuit short to high voltage or a sensor open circuit	CAC downstream temperature sensor voltage	>	4.93	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	A
			same as downstream CAC temperature	<	-53	°C	and 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 #68)	>	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	-		
			rail pressure deviation from setpoint calculated out of difference between desired and actual value (see Look-Up-Table #71)	>	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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and metering unit actuator test active	=	FALSE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 #69)	<	-80000 to -18000	kPa	current injection quantity	>	8.00	mm^3/rev	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							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	<	-18000.00	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 NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible	P008F	Detects a biased ECT or fuel temperature by comparing start-up temperatures between the two sensors.	**Path 1:**				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #15) where (	>	100 to 999	°C	and					
							ambient temperature	>	-60.04	°C		
			(a) captured engine coolant temperature at start	=	measured parameter	-	and					
			and				Engine Running	=	TRUE	-		
			(b) captured fuel temperature at start	=	measured parameter	-	for time	>	0.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			)		and			
					engine post drive/ afterun	= FALSE		
			or		and			
			Path 2:		diagnostic performed in current drive cycle (once per trip monitor)	= FALSE		
			|(a) - (b)| (see Look-Up-Table #15)	<= 100 to 999 °C	and			
			with		basic enable conditions met:	= see sheet enable tables -		
			(a) captured engine coolant temperature at start	= measured parameter -	and			
			and		NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			(b) captured fuel temperature at start	= measured parameter -				
			and					
			|(a) - (b)| (see Look-Up-Table #16)	> 20 to 999 °C				
			where					
			(a) captured engine coolant temperature at start	= measured parameter -				
			and					
			(b) captured fuel temperature at start	= measured parameter -				
			and					
			(					
			block heater detected (see parameter definition)	= FALSE -				
Fuel Pressure Regulator 1 Control Circuit/Open	P0090	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	battery voltage	> 11.00 V	fail conditions exists for 1 monitor runs with 0.01 s rate whenever enable conditions are met	A
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					and			
					Basic enable conditions met	= see sheet enable tables -		
		Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11.00 V	fail conditions exists for 1 monitor runs with 0.01 s rate whenever enable conditions	A
					for time	> 3.00 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	>	3.00	sec	are met	
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and Basic enable conditions met	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 Control Circuit Low	P0091	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	battery voltage	>	11.00	V	fail conditions exists for 0.75s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and Basic enable conditions met	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 Control Circuit High	P0092	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and 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.
Intake Air Temperature (IAT) Sensor 2 Circuit Low Voltage	P0097	Detects low voltage readings on the MAF IAT circuit, indicating an OOR low condition on the MAF IAT circuit (IAT #2)	MAF intake air temperature sensor voltage	<	0.08	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
			same as intake air temperature	>	150	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Intake Air Temperature (IAT) Sensor 2 Circuit High Voltage	P0098	Detects high voltage readings on the MAF IAT circuit, indicating an OOR high condition on the MAF IAT circuit (IAT#2)	MAF intake air temperature sensor voltage	>	4.93	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
			same as intake air temperature	<	-52	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 High Control Circuit Low Voltage	P00C9	Diagnoses the Fuel Pressure Regulator 1 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ignition on	=	TRUE	-	fail conditions exists for 0.5s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and Basic enable conditions met		See sheet enable tables			
Fuel Rail Pressure Regulator 1 High Control Circuit High Voltage	P00CA	Diagnoses the Fuel Pressure Regulator 1 high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable	A
							for time	>	3.00	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 for time and NO Pending or Confirmed DTCs: and Basic enable conditions met	= > = =	FALSE 3.00 see sheet inhibit tables see sheet enable tables	- sec - -	conditions are met	
Intake Air Temperature Sensor 3 Circuit Low Voltage	P00EA	Detects low voltage readings on the intake air temperature sensor 3 circuit, indicating an OOR low condition.	intake air temperature sensor 3 voltage same as temperature of intake air temperature sensor 3	< >	0.03 250	V °C	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	= = =	TRUE see sheet enable tables see sheet inhibit tables	- - -	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
Intake Air Temperature Sensor 3 Circuit High Voltage	P00EB	Detects high voltage readings on the intake air temperature sensor 3 circuit, indicating an OOR high condition.	intake air temperature sensor 3 voltage same as temperature of intake air temperature sensor 3	> <	4.93 -53	V °C	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	= = =	TRUE see sheet enable tables see sheet inhibit tables	- - -	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
Humidity Sensor Circuit Low	P00F4	Detects a low duty cycle signal from the humidity sensor, indicating an OOR low condition on the humidity sensor circuit	**Path1:** Humidity Sensor Duty Cycle same as relative humidity	 < >	 5.00 100.00	 % %	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= > > < = =	TRUE 1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	- sec V V - -	fail conditions exists for 0.1 s test performed continuously with 0.1 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.
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short low condition on the humidity sensor circuit.	**Path 2:** Internal ECM PWM circuit low voltage and ECM PWM circuit maximum period detected or Internal ECM PWM period not received	 = TRUE - = TRUE - = TRUE -	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= TRUE - > 1.00 sec > 11.00 V < 655.34 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
Humidity Sensor Circuit High	P00F5	Detects a high duty cycle signal from the humidity sensor, indicating an OOR high condition on the humidity sensor circuit	**Path 1:** Humidity Sensor Duty Cycle same as relative humidity	 > 95.00 % < 0.00 %	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= TRUE - > 1.00 sec > 11.00 V < 655.34 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short high condition on the humidity sensor circuit.	**Path 2:** Internal ECM PWM circuit high voltage and ECM PWM circuit maximum period detected or	 = TRUE - = TRUE -	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage	= TRUE - > 1.00 sec > 11.00 V < 655.34 V	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Internal ECM PWM period not received	=	TRUE	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Humidity Sensor Circuit Intermittent / Erratic	P00F6	The humidity signal performance monitor monitors the humidity signal delta in a defined time interval. The sum of these signal delta's over a number of time intervals is compared to a threshold.	Cumulative Humidity Sensor signal delta	>=	50.00	%	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 4 out of 5 windows (x out of y), test is performed continuously with 0.1 s rate	B
			accumulated over a defined time interval	>	5.00	counts	and					
			same as				basic enable conditions met:	=	see sheet enable tables	-		
			accumulated over time	>	0.13	sec	and					
							no pending or confirmed DTCs	=	see sheet inhibit 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	>	74.80	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 and with	=	0.80	ratio	engine coolant temperature	>=	69.96	°C		
			(b) air temperature dependent correction factor curve (see Look-Up-Table #1)	=	0 to 0.05	-	and engine coolant temperature	<=	129.96	°C		
			or				and					
			measured air mass flow signal with	>	(c) + (b)	-						
							gradient of the charge-air temperature	>=	-2.00	°C / sec		
			(c) Engine load dependent MAP for calculating higher threshold and with	=	1.2	ratio	and					
							gradient of the charge-air temperature	<=	2.00	°C / sec		
			(b) air temperature dependent correction factor curve (see Look-Up-Table #1)	=	0 to 0.05	-	and					
			)				(					
							Engine Runnung	=	TRUE	-		
							for					
							time since start	>	90.00	sec		
							)					
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							control value of the throttle valve	>=	-400.00	%		
							and					
							control value of the throttle valve	<=	5.00	%		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>=	-400.00	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<=	2.00	%		
							for					
							time	>	3.00	sec		
							)					
							and					
							injection quantity	<=	300.00	mm^3/rev		
							and					
							air pressure in the induction volume	<=	280.00	kPa		
							and					
							engine speed	>=	-16325.00	rpm		
							and					
							engine speed	<=	3100.00	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 low condition on the MAF circuit	signal period of air mass flow sensor (MAF)	>	881.00	usec	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	A
			same as air mass flow	<	14.04	g/sec	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Mass Air Flow (MAF) Sensor Circuit Low Voltage	P0103	Detects high frequency readings on the MAF circuit, indicating an OOR high 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)	<	50.00	usec	basic enable conditions met:	=	see sheet enable tables	-		
			same as				and					
			air mass flow	>	7354.80	g/sec	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.
Manifold Absolute Pressure (MAP) Sensor Performance	P0106	Detects a skewed MAP or BARO sensor by comparing MAP readings to the BARO sensor	**Path 1:**				engine coolant 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)	<	-15.00	kPa	and					
							current injection quantity	<	1308.00	mm^3/rev		
			or				and					
			Path 2:				actuator position of throttle valve	<=	327.67	%		
			(a) - (b)	>	15.00	kPa	and					
			where				turbo charger (VNT) wiping is active (see parameter definition)	=	FALSE	-		
			(a) MAP sensor measured pressure	=	measured parameter	-	and					
			and				(					
			(b) BARO sensor measured pressure	=	measured parameter	-	engine speed	>=	0.00	rpm		
							and					
							engine speed	<=	100.00	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
			(				which means					
			sensor voltage of manifold absolute pressure	<	0.91	V	number of crankshaft revolutions	>=	4.00	revs		
			same as				and					
			manifold absolute pressure	<	44.9	kPa	crankshaft reference mark detected	=	TRUE	-		
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)					
			and				and					
			actuator position of throttle valve	<=	20.00	%	basic enable conditions met:	=	see sheet enable tables	-		
			)									
			or									
			Path 2:									
			(									
			sensor voltage of manifold absolute pressure	<	0.38	V						
			same as									
			manifold absolute pressure	<	-0.3	kPa						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and actuator position of throttle valve)	> >	20.00	%						
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 same as manifold absolute pressure	> >	4.75 371.3	V kPa	engine synchronization completed which means number of crankshaft revolutions and crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration) and basic enable conditions met:	= >= = =	TRUE 4.00 TRUE see sheet enable tables	- revs - -	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
Intake Air Temperature Sensor 1 Circuit Low	P0112	Detects a low PWM period from the humidity temperature sensor, indicating an OOR low condition on the humidity temperature sensor circuit	**Path 1:** Humidity Temperature sensor period same as humidity temperature	 < >	 0.26 145.96	 centisecond °C	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= > > < = =	TRUE 1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	- sec V V - -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short low condition on the humidity sensor circuit.	**Path 2:** Internal ECM PWM circuit low voltage and ECM PWM circuit maximum period detected or	 = =	 TRUE TRUE	 - -	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage	= > > <	TRUE 1.00 11.00 655.34	- sec V V	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Internal ECM PWM period not received	= TRUE -	and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					no pending or confirmed DTCs	= see sheet inhibit tables -		
Intake Air Temperature Sensor 1 Circuit High	P0113	Detects a high PWM period from the humidity temperature sensor, indicating an OOR high condition on the humidity temperature sensor circuit	**Path 1:**		Engine Running (please see the definition)	= TRUE -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
			Humidity Temperature sensor period	> 10.00 centisecond	and			
			same as humidity temperature	< -60.00 °C	following conditions for time:	> 1.00 sec		
					battery voltage	> 11.00 V		
					battery voltage	< 655.34 V		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					no pending or confirmed DTCs	= see sheet inhibit tables -		
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short high condition on the humidity sensor circuit.	**Path 2:**		Engine Running (please see the definition)	= TRUE -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			Internal ECM PWM circuit high voltage	= TRUE -	and			
			and		following conditions for time:	> 1.00 sec		
			ECM PWM circuit maximum period detected	= TRUE -	battery voltage	> 11.00 V		
			or		battery voltage	< 655.34 V		
			Internal ECM PWM period not received	= TRUE -	and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					no pending or confirmed DTCs	= see sheet inhibit 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	< 0.51 V	ignition on	= TRUE -	fail conditions exists for 15 s test performed	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	>	149	°C	basic enable conditions met:	=	see sheet enable tables	-	continuously 0.2 s rate	
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	>	4.90	V	ignition on	=	TRUE	-	fail conditions exists for 60 s test performed continuously 0.2 s rate	A
			same as engine coolant temperature	<	-53	°C	and 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 measured engine coolant temperature	<	49.96	°C	and time since start	<	1440.00	sec		
		Low Region Engine Temperature at start < 31 degC AND ambient air temperature <= 10 degC.					and measured engine coolant temperature	>=	-53.04	°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 which is defined by (idle time divided by	<	0.50	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					time since start) where idle time is incremented when: (			
					accelerator pedal value	<= 10.01 %		
					and vehicle speed	<= 9.94 mph		
					and engine speed	<= 500.00 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 -		
		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 -		
			and measured engine coolant temperature	< 70.96 °C	and time since start	< 1440.00 sec		
		High region Engine Temperature at start < 52 degC AND ambient air temperature > 10 degC			and measured engine coolant temperature and	>= -53.04 °C		
					captured value of coolant temperature during start	<= 51.96 °C		
					and (ambient temperature	> -7.04 °C		
					and ambient temperature	< 59.96 °C		
					) and ambient temperature (used for high region determination)	> 9.96 °C		
					and engine idle time ratio which is defined by (idle time divided by time since start)	< 0.50 %		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					where idle time is incremented when: (					
					accelerator pedal value and	<=	10.01	%		
					vehicle speed and	<=	9.94	mph		
					engine speed) and	<=	500.00	rpm		
					diagnostic performed in current dc and	=	FALSE	-		
					basic enable conditions met: and	=	see sheet enable tables	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
HO2S Bank 1 Sensor 1 Circuit Low	P0131	Detects an out of range low fault of the upstream Nox sensor lambda signal	Upstream Nox sensor lambda signal received via CAN	< -150.00 counts (-150 counts = 1100 Lambda = ~27 %O2)	Valid upstream 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
					Engine Running (see parameter definition)	=	TRUE	-		
					for time (required for the NOx sensor to give valid response) and	>	20.00	sec		
					basic enable conditions met:	=	see sheet enable tables	-		
HO2S Bank 1 Sensor 1 Circuit High	P0132	Detects an out of range high fault of the upstream Nox sensor lambda signal	Upstream Nox sensor lambda signal received via CAN	> 1550.00 counts (1550 counts = 0.65 Lambda = -0.1178 %O2)	Valid upstream 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
					Engine Running (see parameter definition)	=	TRUE	-		
					for time (required for the NOx sensor to give valid response) and	>	20.00	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 received via CAN	< -150.00 counts (-150 counts = 1100 Lambda = ~27 %O2)	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	B
					Engine Running (see parameter definition)	=	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 (required for the NOx sensor to give valid response)	>	20.00	sec	conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
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 received via CAN	>	1550.00	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)	>	20.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor - O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1	P014C	measure O2 response time of upstream NOx sensor until O2 concentration reaches the calibrated upper limit of the modeled O2 concentration in overrun state	measured O2 response time	<	2.00	sec	**global enable condition:**				fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			with				Engine speed	>	600.00	rpm		
			O2 concentration of the sensor	<=	((0.2095 - (a)) * (b)) + (a)	factor	Engine speed	<	4000.00	rpm		
			where				Battery voltage	>	11.00	V		
			(a) modeled O2 in waiting-injection falling state	=	modelled O2 concentration	factor	Ambient Air Pressure	>=	74.80	kPa		
			(b) factor for the determination of the upper limit of modeled O2 concentration	=	0.60	factor	Ambient Air Pressure	<=	106.00	kPa		
							Ambient Air Temperature	>=	-7.04	°C		
							Ambient Air Temperature	<=	124.96	°C		
							Engine operation mode	=	normal	-		
							Post injection	=	inactive	-		
							Oxygen Concentration Signal	=	active	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							Communication with NOx Sensor	=	active	-		
							Exhaust Gas Temperature	>=	-0.04	°C		
							Exhaust Gas Temperature	<=	1299.96	°C		
							Additional enable conditions for transitioning state machine from inactive state to stable operation state:					
							following conditions for time:	>	1.80	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					modeled O2 signal (based on injection quantity, air mass and fuel density)	<	0.12	-		
					Fuel Injection Quantity	>	120.00	mm^3/rev		
					Engine speed	>	600.00	rpm		
					Additional enable conditions for transitioning state machine from stable operation state to wait-Injection falling state:					
					Fuel Injection Quantity	<	a+b	-		
					with					
					a) Measured and stored Fuel Injection Quantity at start of diagnosis	=	measured parameter	-		
					b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					and					
					Fuel Injection Quantity	>	a-b	-		
					with					
					a) Measured and stored Fuel Injection Quantity at start of diagnosis	=	measured parameter	-		
					b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					and					
					Engine speed	>	600.00	rpm		
					Additional enable conditions for transitioning state machine from wait-Injection falling state to wait-overrun state:					
					Fuel Injection Quantity	<	120.00	mm^3/rev		
					Fuel Injection Quantity	<	a+b			
					with					
					a) Measured and stored Fuel Injection Quantity at start of diagnosis	=	measured parameter	-		
					b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					Additional enable conditions for transitioning state machine from wait-overrun state to overrun state:					
					following for exhaust gas transfer time:	>	0.50	sec		
					actual valve position of exhaust-gas recirculation	>=	0.00	%		
					and					
					actual valve position of exhaust-gas recirculation	<=	80.00	%		
					and					
					within the time fuel injection falling below	<	1.05	sec		
					Fuel Injection Quantity	<	4.00	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.
					Fuel Injection Quantity with	<	a+b			
					a) Measured Minimum Fuel Injection Quantity	=	measured parameter	-		
					b) Maximum fluctuation of Injection Quantity	=<	16.00	mm^3/rev		
					Additional enable conditions for transitioning state machine from overrun state to delay state:					
					actual valve position of exhaust-gas recirculation and	>=	0.00	%		
					actual valve position of exhaust-gas recirculation	<=	80.00	%		
					Deviation from maximum O2 concentration during overrun	<	0.06	-		
					Additional enable conditions for transitioning from delay state to diagnostic completion state:					
					actual valve position of exhaust-gas recirculation and	>=	0.00	%		
					actual valve position of exhaust-gas recirculation	<=	80.00	%		
					Deviation from maximum O2 concentration during overrun	<	0.06	-		
Fuel Trim System Lean	P0171	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the feedback limit.	Fuel mass observer emission correction quantity (see Look-Up Table #41)	<= -164.4 to -46.12 mm^3/rev	(Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
					means (					
					lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
					fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
					Particulate Filter Regeneration Mode	=	FALSE	-		
					((					
					fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
					or					
					calculated EGR rate	>=	0	-		
					)					
					for time	>	1.00	sec		
					))					
					AND					
					Controller status of the observer	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					means					
					(					
					Load dependent release state (see look up table #48)	=	0 to 1	-		
					AND					
					Component Protection release state (see look up table #43)	>	0 to 1	-		
					)					
					)					
					engine coolant temperature	<=	199.96	°C		
					engine coolant temperature	>=	64.96	°C		
					Normal Injection Mode	=	TRUE	-		
					Barometric pressure	>=	74.80	kPa		
					Ambient temperature	>=	-7.04	°C		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		
Fuel Trim System Rich	P0172	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the feedback limit.	Fuel mass observer emission correction quantity (see Look-Up Table #46)	>= 46.12 to 164.64 mm^3/rev	(Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
					means					
					(					
					lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
					fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
					Particulate Filter Regeneration Mode	=	FALSE	-		
					((					
					fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
					or					
					calculated EGR rate	>=	0	-		
					)					
					for time	>	1.00	sec		
					))					
					AND					
					Controller status of the observer	=	TRUE	-		
					means					
					(					
					Load dependent release state (see look up table #48)	=	0 to 1	-		
					AND					
					Component Protection release state (see look up table #43)	>	0 to 1	-		
					)					
					)					
					engine coolant temperature	<=	199.96	°C		

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	>=	64.96	°C		
							Normal Injection Mode	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel pump 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	<	0.60	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	>	59	°C	basic enable conditions met:	=	see sheet enable tables	-		
Fuel pump 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	>	4.71	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	<	-50.04	°C	basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 2 Circuit Low	P0187	Detects low voltage condition of the fuel temperature sensor circuit, indicating an OOR low condition	fuel temperature sensor voltage	<	0.60	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	>	150	°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 Temperature Sensor 2 Circuit High	P0188	Detects high voltage condition of the fuel temperature sensor circuit, indicating an OOR high condition	fuel temperature sensor voltage	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as fuel temperature	<	-50	°C	and basic enable conditions met:	=	see sheet enable tables	-		
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 fuel pressure regulator 2 adaptation factor	<=	0.75	factor	and adaptation for fuel pressure regulator 2 active	=	TRUE	-		
							means (counter for successful adaption	>	0	counts		
							or counter for the successful calculation of the adaptation	>	9.00	counts		
							and (engine speed	>	400.00	rpm		
							and engine speed	<	1000.00	rpm		
							) and vehicle speed	<=	1.86	mph		
							and (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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		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.	(				engine post drive/ afterun	=	TRUE	-	all conditions exists for more than 30 monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	
			rail pressure sensor voltage	<	0.35	V	and					
			or				fuel temperature	>	-0.04	°C		
			rail pressure sensor voltage	>	0.65	V	and					
			)				engine has already run in this driving cycle	=	TRUE	-		
							and					
							rail pressure is reduced	=	TRUE	-		
							means					
							rail pressure	<	0.00	Kpa		
							and					
							fuel pressure regulator 2 current	<=	1.70	Amps		
							and					
							time since engine off	>	30.08	sec		
							and					
							number of fault measurements during engine postdrive/ afterun	>	10.00	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	<	0.19	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	-		
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	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.
			rail pressure	>	220000.00	kPa	basic enable conditions met:	=	see sheet enable tables	-	rate whenever enable conditions are met	
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 1 Injection Timing Retarded	P01CB	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	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) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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 2 Injection Timing Retarded	P01CD	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and accelerator pedal position and Fuel system status and (engine speed and engine speed with (a) value of engine speed and with (b) gear specific minimum engine speed and with (c) gear specific maximum engine speed) and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and vehicle speed and rail pressure deviation from setpoint calculated out of difference between desired and actual value for time and no gear change is occurred and 4 wheel mode and basic enable conditions met: and NO Pending or Confirmed DTCs:	< 0.05 % = Fuel cut off - > (b) - (a) - < (a) + (c) - = 30.00 rpm = 950.00 rpm = 1850.00 rpm = 0 to 1 - > 0.00 mph < 5000.00 kPa > 0.10 sec = TRUE - = FALSE - = see sheet enable tables - = see sheet inhibit tables -		
Cylinder 7 Injection Timing Retarded	P01D7	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. Detects a fault when the corrected energizing time exceeds the allowed limit.	(corrected energizing time for the rail pressure calibration points and cylinder 7 (with (a) maximum injection energizing time and with (b) offset of the maximum filtered energizing time	> (a) - (b) - = 384.4 usec = 12 usec	environmental temperature and (fuel temperature and fuel temperature)	> -7.04 °C >= 0.06 °C <= 79.96 °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.
			)		and			
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point	= 70000.00 kPa	and			
					battery voltage	> 10.00 V		
					and			
					combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #94)	>= 5 to 30 sec		
					and			
					intake manifold pressure	> 75.00 kPa		
					and			
					intake manifold pressure	< 150.00 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30.00 rpm		
					and with			
					(b) gear specific minimum engine speed	= 950.00 rpm		
					and with			
					(c) gear specific maximum engine speed	= 1850.00 rpm		
					)			
					and			
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	= 0 to 1 -		
					and			
					vehicle speed	> 0.00 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 5000.00 kPa		
					for			
					time	> 0.10 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 8 Injection Timing Retarded	P01D9	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>	0.10	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 4 Injection Timing Retarded	P01D1	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 (a) maximum injection energizing time	=	384.4	usec	(fuel temperature and	>=	0.06	°C		
			and with (b) offset of the maximum filtered energizing time))	=	12	usec	fuel temperature) and	<=	79.96	°C		
			for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
							battery voltage	>	10.00	V		
							and combustion chamber is not cold off means time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and intake manifold pressure	>	75.00	kPa		
							and intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position	<	0.05	%		
							and Fuel system status	=	Fuel cut off	-		
							and (engine speed	>	(b) - (a)	-		
							and engine speed	<	(a) + (c)	-		
							with (a) value of engine speed and with	=	30.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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 Retarded	P01D3	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	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.
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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	P01D5	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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	=	384.4	usec	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		fuel temperature	<= 79.96 °C		
			(b) offset of the maximum filtered energizing time	= 12 usec	)			
			)		and			
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point	= 70000.00 kPa	and			
					battery voltage	> 10.00 V		
					and			
					combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #94)	>= 5 to 30 sec		
					and			
					intake manifold pressure	> 75.00 kPa		
					and			
					intake manifold pressure	< 150.00 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30.00 rpm		
					and with			
					(b) gear specific minimum engine speed	= 950.00 rpm		
					and with			
					(c) gear specific maximum engine speed	= 1850.00 rpm		
					)			
					and			
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	= 0 to 1 -		
					and			
					vehicle speed	> 0.00 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 5000.00 kPa		
					for			
					time	> 0.10 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 3 Injection Timing Retarded	P01CF	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 3	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>	0.10	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 1 Injection Timing Advanced	P01CC	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 1	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and with (b) gear specific minimum engine speed	=	950.00	rpm		
							and with (c) gear specific maximum engine speed	=	1850.00	rpm		
							) and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and vehicle speed	>	0.00	mph		
							and rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time	>	0.10	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 2 Injection Timing Advanced	P01CE	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 2	<	(a) + (b)	-	and					
			(with				(fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			))				and					
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and combustion chamber is not cold off means					

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 #93) (diagnostic enabled when equal to 1)	>=	5 to 30	sec		
					and					
					intake manifold pressure	>	75.00	kPa		
					and					
					intake manifold pressure	<	150.00	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30.00	rpm		
					and with					
					(b) gear specific minimum engine speed	=	950.00	rpm		
					and with					
					(c) gear specific maximum engine speed	=	1850.00	rpm		
					)					
					and					
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
					and					
					vehicle speed	>	0.00	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
					for					
					time	>	0.10	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	P01D8	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 7	< (a) + (b) -	and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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 8 Injection Timing Advanced	P01DA	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 8	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	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	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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 4 Injection Timing Advanced	P01D2	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 4	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							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	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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	P01D4	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	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	>	10.00	V		
					and					
					combustion chamber is not cold off					
					means					
					time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
					and					
					intake manifold pressure	>	75.00	kPa		
					and					
					intake manifold pressure	<	150.00	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					and					
					(					
					engine speed	>	(b) - (a)	-		
					and					
					engine speed	<	(a) + (c)	-		
					with					
					(a) value of engine speed	=	30.00	rpm		
					and with					
					(b) gear specific minimum engine speed	=	950.00	rpm		
					and with					
					(c) gear specific maximum engine speed	=	1850.00	rpm		
					)					
					and					
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
					and					
					vehicle speed	>	0.00	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
					for					
					time	>	0.10	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 6 Injection Timing Advanced	P01D6	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 6	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	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	<	5000.00	kPa		
							for					
							time	>	0.10	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 3 Injection Timing Advanced	P01D0	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated 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 3	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							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	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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	-		
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	Detects a stuck open thermostat by monitoring for a decrease of the engine coolant temperature below the OBD monitoring threshold during normal operating conditions	engine coolant temperature	<	70.96	°C	engine pre drive	=	FALSE	-	fail conditions exists for 0.2 s monitor runs with 0.2 s rate whenever enable conditions are met	B
			for fault counter	>=	400.00	-	and					
			which is equivalent to fault time	>=	80.00	sec	ambient temperature	>=	-7.04	°C		
							and					
							engine coolant temperature at least once in driving cycle	>=	70.96	°C		
							and					
							instantaneous fuel consumption (low-pass filtered)	>=	9.00	liters / hr		
							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.
Injector 1 Control Circuit	P0201	Diagnoses the Fuel Injector Cylinder #1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	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	Diagnoses the Fuel Injector Cylinder #2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	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 3 Control Circuit	P0203	Diagnoses the Fuel Injector Cylinder #3 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	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 4 Control Circuit	P0204	Diagnoses the Fuel Injector Cylinder #4 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load	-	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	Diagnoses the Fuel Injector Cylinder #5 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load	-	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 6 Control Circuit	P0206	Diagnoses the Fuel Injector Cylinder #6 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load	-	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 7 Control Circuit	P0207	Diagnoses the Fuel Injector Cylinder #7 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	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	Diagnoses the Fuel Injector Cylinder #8 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	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
Turbocharger/Supercharger "A" Overboost Condition	P0234	Detects an permanent negative control deviation of the boost pressure indicating and overboost condition	control deviation of the boost pressure calculated out of difference between desired and actual value (see Look-Up-Table #4)	<	(d*e*f)	-	(				fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with				VNT turbocharger offset adaptation active - 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	=	FALSE	-		
			(d) The lower threshold pressure (see Look-Up-Table #62)	=	-31.5 to -10	kPa						
			(e) correction factor (see Look-Up-Table #60)	=	0.699951 to 1	factor	and					
			(f) ECB valve based lower limit correction factor	=	1.00	factor	VNT turbocharger 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			
					injection quantity is stable	= TRUE -		
					means			
					increase of injection quantity	< 40.00 (mm^3/rev)/s		
					and			
					engine speed is stable	= TRUE -		
					means			
					increase of engine speed	< 35.00 rpm/s		
					and			
					injection Quantity	>= 112.00 mm^3/rev		
					injection Quantity	<= 1308.00 mm^3/rev		
					and			
					engine Speed	>= 1600.00 rpm		
					engine Speed	<= 3000.00 rpm		
					and			
					working range of boost pressure is in closed-loop	= TRUE -		
					means			
					(			
					engine speed	> 1200.00 rpm		
					and			
					injection quantity	> 20.00 mm^3/rev		
					)			
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					)			
					for time	> 2.00 sec		
					and			
					Basic enable conditions met	= see sheet enable tables -		
Turbocharger/Supercharger "A" Underboost Condition	P0299	Detects an permanent positive control deviation of the boost pressure indicating and underboost condition.	control deviation of the boost pressure calculated out of difference between desired and actual value (see Look-Up-Table #3)	> (a*b*c) -	(		fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with		VNT turbocharger offset adaptation active	= FALSE -		
			(a) the upper limit (see Look-Up-Table #61)	= 19 to 40 kPa	- 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			
			(b) Correction factor (see Look-Up-Table #97)	= 1 to 1.099976 factor	and			
			(c) ECB valve based upper limit correction factor	= 1.00 factor	VNT turbocharger 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					
							injection quantity is stable	=	TRUE			
							means					
							increase of injection quantity	<	40.00	(mm^3/rev) /s		
							and					
							engine speed is stable	=	TRUE	-		
							means					
							increase of engine speed	<	35.00	rpm/s		
							and					
							injection Quantity	>=	112.00	mm^3/rev		
							injection Quantity	<=	1308.00	mm^3/rev		
							and					
							engine Speed	>=	1600.00	rpm		
							engine Speed	<=	3000.00	rpm		
							and					
							working range of boost pressure is in closed-loop	=	TRUE	-		
							means					
							(					
							engine speed	>	1200.00	rpm		
							and					
							injection quantity	>	20.00	mm^3/rev		
							)					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>	2.00	sec		
							and					
							Basic enable conditions met:	=	see sheet enable tables	-		
Clyinder 1 Balance System	P0263	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	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	-		
Clyinder 2 Balance System	P0266	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Clyinder 3 Balance System	P0269	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	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.
Clyinder 4 Balance System	P0272	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Clyinder 5 Balance System	P0275	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Clyinder 6 Balance System	P0278	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	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.
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C	enable conditions are met	
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Clyinder 7 Balance System	P0281	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Clyinder 8 Balance System	P0284	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	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	-		
CAC Efficiency Below Threshold	P026A	Detects insufficient charge-air cooler efficiency. The efficiency is calculated out of temperature upstream of the charge air cooler, temperature downstream of the charge air cooler and ambient temperature.	filtered charge-air cooler efficiency	<	0.25	-	vehicle speed	>=	37.29	mph	fail conditions exists for 30 s monitor runs once per driving cycle with 100 ms rate whenever enable conditions are met	B
							air mass flow	>=	83.33	g/s		
							air mass flow	<=	152.77	g/s		
							engine coolant temperature	>=	69.96	°C		
							engine coolant temperature	<=	129.96	°C		
							(maximum value of (a) and (b))	>=	1.22	-		
							the maximum value is then divided by (b)					
							with					
							(a) boost pressure downstream compressor	=	measured parameter	-		
							and with					
							(b) ambient pressure	=	measured parameter	-		
							and					
							control value of the throttle valve	>=	-400.00	%		
							control value of the throttle valve	<=	5.00	%		
							and					
							(a) - (b)	>=	50.00	°C		
							with					
							(a) charge air cooler upstream temperature	=	measured parameter	-		
							and with					
							(b) modeled ambient air temperature	=	measured parameter	-		
							and					
							injection quantity	>=	80.00	mm^3/rev		
							injection quantity	<=	480.00	mm^3/rev		
							ambient pressure	>	74.80	kPa		
							modeled ambient air temperature	>	-7.04	°C		
							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.
Injection Quantity Too Low	P026C	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the emissions limit.	Unlimited fuel mass observer correction quantity - emission control correction quantity (see Look-Up-Table #45)	<=	-34.8 to -20	mm^3/rev	((Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							means					
							(					
							lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
							or					
							calculated EGR rate	>=	0	-		
							)					
							for time	>	1.00	sec		
							))					
							AND					
							Controller status of the observer	=	TRUE	-		
							means					
							(					
							Load dependent release state (see look up table #48)	=	0 to 1	-		
							AND					
							Component Protection release state (see look up table #43)	>	0 to 1	-		
							)					
							)					
							engine coolant temperature	<=	199.96	°C		
							engine coolant temperature	>=	64.96	°C		
							Normal Injection Mode (not in DPF regeneration)	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							Vehicle speed	<	1.86	mph		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
							)					
							AND					
							(					
							Engine speed	<=	1040	rpm		
							AND					
							Engine speed	>=	448	rpm		
							)					
							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.
Injection Quantity Too High	P026D	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the emissions limit.	Unlimited fuel mass observer correction quantity - emission control correction quantity (see look up table #44)	>=	16 to 34.8	mm^3/rev	((Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							means (					
							lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
							or calculated EGR rate	>=	0	-		
							) for time	>	1.00	sec		
							)) AND Controller status of the observer	=	TRUE	-		
							means (Load dependent release state (see look up table #48)	=	0 to 1	-		
							AND Component Protection release state (see look up table #43)	>	0 to 1	-		
							)) engine coolant temperature	<=	199.96	°C		
							engine coolant temperature	>=	64.96	°C		
							Normal Injection Mode (not in DPF regeneration)	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							Vehicle speed	<	1.86	mph		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
							) AND (Engine speed	<=	1040	rpm		
							AND Engine speed	>=	448	rpm		
							) 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.
Cylinder 1 Injection	P02CD	Monitors the correction	(				environmental temperature	>	-7.04	°C	fail	B
Timing Reached		values for the energizing									conditions	
Feedback Limit		time of each cylinder.									exists for	
		A correction value for the									more than	
		energizing time is learned									0.5 s	
		for each cylinder at three									monitor runs	
		different rail pressure									with 0.01 s	
		operating point.									rate	
		Detects a fault when the	corrected energizing time for the rail	>	(a) - (b)	-	and				whenever	
		corrected energizing time	pressure calibration points and cylinder 1								enable	
		exceeds the feedback									conditions	
		control limit.									are met	
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	353.2 to 670.8	usec	and					
			(see Look-Up-Table #20)									
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered	=	10 to 16	usec	)					
			energizing time (see Look-Up-Table									
			#21)									
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail	<	(a) + (b)	-	battery voltage	>	10.00	V		
			pressure calibration points and cylinder 1									
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered	=	10 to 16	usec	time since last combustion (see Look-	>=	5 to 30	sec		
			energizing time (see Look-Up-Table				Up-Table #94)					
			#22)									
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
			#19)									
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine	=	950.00	rpm		
							speed					
							and with					
							(c) gear specific maximum engine	=	1850.00	rpm		
							speed					
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time	>	0.10	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 2 Injection Timing Reached Feedback Limit	P02CF	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control 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 #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 2	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	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.
			)		intake manifold pressure	> 75.00 kPa		
			for		and			
			rail pressure point (see Look-Up-Table #19)	= 30000 to 90000 kPa	intake manifold pressure	< 150.00 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30.00 rpm		
					and with			
					(b) gear specific minimum engine speed	= 950.00 rpm		
					and with			
					(c) gear specific maximum engine speed	= 1850.00 rpm		
					)			
					and			
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	= 0 to 1 -		
					and			
					vehicle speed	> 0.00 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 5000.00 kPa		
					for			
					time	> 0.10 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 Reached Feedback Limit	P02D9	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 7	> (a) - (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 7	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel 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.
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection Timing Reached Feedback Limit	P02DB	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control 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 #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 8	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	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) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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 4 Injection Timing Reached Feedback Limit	P02D3	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control 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 #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 4	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	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 Reached Feedback Limit	P02D5	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control 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 #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 5	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	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 #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time	>	0.10	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 Reached Feedback Limit	P02D7	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 6	>	(a) - (b)	-	and					
			(				(					
			with (a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	fuel temperature	>=	0.06	°C		
							and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 6	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			for		and			
			rail pressure point (see Look-Up-Table #19)	= 30000 to 90000 kPa	intake manifold pressure	< 150.00 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30.00 rpm		
					and with			
					(b) gear specific minimum engine speed	= 950.00 rpm		
					and with			
					(c) gear specific maximum engine speed	= 1850.00 rpm		
					)			
					and			
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	= 0 to 1 -		
					and			
					vehicle speed	> 0.00 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 5000.00 kPa		
					for			
					time	> 0.10 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 3 Injection Timing Reached Feedback Limit	P02D1	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 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 3	> (a) - (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 3	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel 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.
					basic enable conditions met: and NO Pending or Confirmed DTCs:	= see sheet enable tables - = see sheet inhibit tables -		
Intake Air Flow Valve Control Circuit	P02E0	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit: ≥ 200 K Ω impedance between ECU pin and load -	battery voltage for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> 11.00 V > 3.00 sec = FALSE > 3.00 sec = ACTIVE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 7s monitor runs with 0.005 s rate whenever enable conditions are met	B
			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 and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> 11.00 V > 3.00 sec = FALSE > 3.00 sec = ACTIVE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11.00 V	fail conditions exists for 3 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	3.00	sec	monitor runs with 0.005 s rate whenever enable conditions are met	
					and starter is active cranking	=	FALSE			
					for time	>	3.00	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	-		
Intake Air Flow Valve Control Circuit 1 Low Voltage	P02E2	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					for time	>	3.00	sec		
					and starter is active cranking	=	FALSE			
					for time	>	3.00	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	-		
Intake Air Flow Valve Control Circuit 1 High Voltage	P02E3	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					for time	>	3.00	sec		
					and starter is active cranking	=	FALSE			
					for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time	>	3.00	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	-		
Throttle Valve Actuator (TVA) Position Sensor 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	<	10.00	%	throttle valve controller bypass is active	=	FALSE	-	fail conditions exists for 10 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	>	-10.00	%	throttle valve is driven to a mechanical stop	=	FALSE	-		
							and					
							Throttle Governor Active	=	TRUE	-		
							and					
							Throttle Valve Permanent Control Deviation	=	FALSE	-		
							and					
							Engine Coolant Temperature	<	198.96	°C		
							and					
							Engine Running	=	TRUE	-		
							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	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							analog digital converter error present	=	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.
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	=	TRUE	-	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 sensor supply error	=	TRUE	-		
							and					
							SENT frame correctly received	=	FALSE	-		
							and					
							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.				battery voltage	>	11.00	V	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for time	>	3.00	sec		
							and					
							starter is active cranking	=	FALSE			
							for time	>	3.00	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	-		
Engine Misfire Detected	P0300	Indicates engine has experienced more than one cylinder misfiring	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
			and				and					
			misfires exist on more than one cylinder	=	TRUE	-	|(a) - (b)|	<	200.00	rpm		
							with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
							and					
							time since start	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							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) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms 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	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	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				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	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	>=	10.00	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	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	B
							engine speed	>	900	rpm		
							engine speed	<	2700	rpm	monitor runs	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Wheel learn only occurs when the memory is cleared within the ECM. Once the wheel learn is completed once, the wheel learn values are stored within the EEPROM			fuel balance wheel learn values stored in EEPROM	= FALSE	with 1 s rate whenever enable conditions are met	
					Inhibit Status (no inhibiting faults) (No pending or stored DTC)	= 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 -	Ignition ON	= TRUE -	fail conditions exists for more than 6 events monitor runs with 0.1 s rate whenever enable conditions are met	A
			AND number of crankshaft rotations not detected	>= 6.00 counts	and Engine backward rotation detected	= FALSE -		
					and (engine speed	>= 400.00 rpm		
					and synchronization completed	= TRUE -		
					which means number of crankshaft revolutions	>= 4.00 revs		
					and crankshaft reference mark detected	= TRUE -		
					(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)) or starter is active cranking	= TRUE -		
					) and (vehicle speed	= 0 mph		
					or vehicle speed	> 16 mph		
					and engine speed	> 200.00 rpm		
					) 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	>=	10.00	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	A
			crankshaft signal disturbance detected under the following conditions:				and					
			Current tooth time period	>	200000.00	us	ECM has detected reference mark on the crankshaft	=	FALSE	-		
			or				and					
			Crankshaft tooth counts between detected gaps	>	68.00	counts	basic enable conditions met:	=	see sheet enable tables	-		
			or									
			If gap not expected, ratio of current tooth time to previous tooth time (see Look-Up-Table #18)	>	1.5 to 2	ratio						
			or									
			If gap expected, ratio of current tooth time to previous tooth time (see Look-Up-Table #17)	>	3.38 to 8	ratio						
			with increment	=	1.00	counts						
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	>=	4.00	counts	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	-		
Camshaft Position [CMP] Sensor Performance	P0341	Detects implausible camshaft sensor operation by detecting incorrect cam sensor patterns	number of camshaft edges	>	4	counts	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.
Glow Plug/Heater Indicator Control Circuit/Open	P0381	Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage high during driver off state (open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground	-	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	B
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							Basic enable conditions met:	=	see sheet enable tables	-		
		Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	lamp is commanded on	=	TRUE	-	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							Basic enable conditions met:	=	see sheet enable tables	-		
		Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	lamp is commanded off	=	TRUE		fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	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) 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 (see Look-Up-Table #11)	>	1.6 to 2	g/rev	EGR controller is active	=	TRUE	-	fail conditions exists for 15 s monitor runs 0.02 s rate whenever enable conditions are met	A
							and					
							VGT offset learning is active	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
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 (see Look-Up-Table #12)	=	-1.2 to -0.56	g/rev	and					
			(b) Environmental Pressure correction factor (see Look-Up-Table #8)	=	0.71 to 1	factor	change of injection quantity between actual and last received value	<	40.00	(mm^3/rev) /sec		
							for time	=	0.25	sec		
							and					
							change of engine speed between actual and last received value	<	50.00	rpm/sec		
							for time	=	0.50	sec		
							and					
							VGT offset learning is active	=	FALSE	-		
							maximum setpoint for air-mass flow (see Look-Up-Table #9)	>	0.8 to 1.2	g/rev		
							and					
							Engine speed	<=	1000.00	rpm		
							Engine speed	>=	500.00	rpm		
							and					
							Torque generating commanded engine fuel injection quantity	<=	72.00	mm^3/rev		
							Torque generating commanded engine fuel injection quantity	>=	4.00	mm^3/rev		
							and					
							setpoint valve position of exhaust-gas recirculation	>	5.00	%		
							and					
							throttle position	<	5.00	%		
							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	-		
							)					
							for time	>=	5.00	sec		
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 #10)	=	0.4 to 0.6	g/rev	and					
			(b) Environmental Pressure correction factor	=	1	factor	change of injection quantity between actual and last received value	<	40.00	(mm^3/rev)/sec		
							for time	=	0.25	sec		
							and					
							change of engine speed between actual and last received value	<	50.00	rpm/sec		
							for time	=	0.50	sec		
							and					
							VGT offset learning is active	=	FALSE	-		
							maximum setpoint for EGR mass flow	<	1.00	g/rev		
							and					
							Engine speed	<=	1400.00	rpm		
							Engine speed	>=	1000.00	rpm		
							and					
							Torque generating engine fuel injection quantity	<=	200.00	mm^3/rev		
							Torque generating engine fuel injection quantity	>=	50.00	mm^3/rev		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>=	1.00	sec		
Exhaust Gas Recirculation (EGR) Motor Control Circuit	P0403	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 7 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							and					
							offset learning for EGR valve is completed	=	TRUE	-		
							and					
							battery voltage	>	11.00	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 and starter is active cranking for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	> 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables - = 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 and offset learning for EGR valve is completed and battery voltage for time and starter is active cranking for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	= ACTIVE - = TRUE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
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 same as EGR actuator position	< 0.25 V < -25 %	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 5 s test performed continuously 0.005 s rate	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 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	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
			same as EGR actuator position	>	127	%	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 A Circuit Low Voltage	P040C	Detects low voltage readings on the EGR cooler temperature circuit, indicating an OOR low condition on the EGR cooler temperature 2 circuit	EGR temperature sensor 2 voltage	<	0.46	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as EGR sensor 2 temperature	>	220	°C	time since engine start	>	0.00	sec		
							and engine coolant temperature	<	199.96	°C		
							and ambient temperature	>	-60.04	°C		
							and ambient pressure	>	20.00	kPa		
							and (setpoint valve position of exhaust-gas recirculation	>	-100.00	%		
							and setpoint valve position of exhaust-gas recirculation	<	200.00	%		
							) and Engine Running (see parameter definition)	=	TRUE	-		
							and (valve position of EGR cooler bypass	>	-100.00	%		
							and valve position of EGR cooler bypass	<	200.00	%		
							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 A Circuit High Voltage	P040D	Detects high voltage readings on the EGR temperature cooler circuit, indicating an OOR high condition on the EGR cooler temperature 2 circuit	EGR temperature sensor 2 voltage	>	4.84	V	(				fail conditions exists for 5 s monitor runs 0.05 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.
			same as				time since engine start	>	0.00	sec	conditions are met	
			EGR sensor 2 temperature	<	-50	°C	and					
							engine coolant temperature	>	-60.04	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20.00	kPa		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>	-100.00	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<	200.00	%		
							)					
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							and					
							current injection quantity	>	0.00	mm^3/rev		
							and					
							(					
							valve position of EGR cooler bypass	>	-100.00	%		
							and					
							valve position of EGR cooler bypass	<	200.00	%		
							)					
							)					
							for					
							time	>	0.00	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:**				minimum engine-off time	>=	28800.00	sec	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 #4)	>	100 to 999	°C	and					
			with				ambient temperature	>	-60.04	°C		
			(a) captured EGR sensor 2 temperature at start	=	measured parameter	-	and					
			and with				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured EGR sensor 1 temperature at start	=	measured parameter	-	for					
			or				time	>	0.00	sec		
							and					
			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			
			with				and					
			(a) captured EGR sensor 2 temperature at start	=	measured parameter	-	basic enable conditions met:	=	see sheet enable tables	-		
			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.
			(b) captured EGR sensor 1 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						
			with									
			(a) captured EGR sensor 2 temperature at start	=	measured parameter	-						
			and with									
			(b) captured EGR sensor 1 temperature at start	=	measured parameter	-						
			and									
			(									
			status of block heater (see parameter definition)	=	FALSE	-						
			or									
			status of sun-load detection (see parameter definition)	=	FALSE	-						
			)									
			)									
Exhaust Gas Recirculation(EGR) Temperature Sensor B Circuit Low Voltage	P041C	Detects low voltage readings on the EGR cooler temperature circuit, indicating an OOR low condition on the EGR cooler temperature 1 circuit	voltage of EGR temperature sensor 1	<	0.46	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	>	0.00	sec		
			EGR sensor 1 temperature	>	220	°C	and					
							engine coolant temperature	<	199.96	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20.00	kPa		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>	-100.00	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<	200.00	%		
							)					
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							and					
							(					
							valve position of EGR cooler bypass	>	-100.00	%		
							and					
							valve position of EGR cooler bypass	<	200.00	%		
							)					
							)					
							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 B Circuit High Voltage	P041D	Detects high voltage readings on the EGR cooler temperature circuit, indicating an OOR high condition on the EGR cooler temperature 1 circuit	voltage of EGR temperature sensor 1	>	4.84	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	>	0.00	sec		
			EGR sensor 1 temperature	<	-50	°C	and					
							engine coolant temperature	>	-60.04	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20.00	kPa		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>	-100.00	%		
							and					
							setpoint valve position of exhaust-gas recirculation	<	200.00	%		
							)					
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							and					
							current injection quantity	>	0.00	mm^3/rev		
							and					
							(					
							valve position of EGR cooler bypass	>	-100.00	%		
							and					
							valve position of EGR cooler bypass	<	200.00	%		
							)					
							)					
							for					
							time	>	0.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	<	0.55	-					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 means	>	140.00	g		

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 model uses commanded fuel quantity, DOC temperature, and exhaust gas mass flow as inputs			
					and			
					average HC mass flow	> 0.00 g/sec		
					calculated by			
					Average HC mass flow is determined by dividing the integrated HC mass by the integrated time step			
					and			
					simulated heat quantity in oxidation catalyst	> 0.00 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			
					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			
					(			
					particulate filter regeneration	= TRUE -		
					)			
					and			
					measured temperature upstream of the oxidation catalyst	> 249.96 °C		
					and			
					(			
					engine speed	> 700.00 rpm		
					and			
					engine speed	< 3400.00 rpm		
					)			
					and			
					diagnostic performed in current dc	= FALSE -		
					and			
					reset condition	= FALSE -		
					which becomes False under following conditions			
					(			
					converted HC mass in the oxidation catalyst during monitoring	< 140.00 g		
					calculated by integrating the amount of fuel injected by the HCI (Hydro-Carbon Injector)			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							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)	>=	100.00	miles	Engine Running	=	TRUE	-	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				for					
			(a) total vehicle distance	=	measured parameter	-	time	>=	60.00	sec		
			and with				and					
			(b) change in mileage	=	calculated parameter	-	fuel transfer pump active	=	FALSE	-		
							means					
			and				(					
			(c) - (d)	<	4.00	l	filtered fuel volume in primary tank	>	1638.35	l		
			with				(fuel volume is calculated by converting the measured fuel level (%) to volume based on the calibratable fuel tank maximum capacity)					
			(c) maximum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	and					
			and with				filtered fuel volume in secondary tank	<	0.00	l		
			(d) minimum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	for					
							time	>=	0.00	sec		
							and					
							cumulative transfer pump on time in current ignition cycle	>	0.00	sec		
							)					
							and					
							fuel level zone 3	=	TRUE	-		
							means					
							(					
							filtered fuel volume in primary tank	<	137.40	l		
							and					
							filtered fuel volume in secondary tank	>	0.00	l		
							)					
							or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							fuel level zone 4	=	TRUE	-		
							means					
							(					
							filtered fuel volume in primary tank	<	137.40	l		
							and					
							filtered fuel volume in secondary tank	<=	0.00	l		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	-	see sheet inhibit tables	-		
SRC low for fuel level sensor of primary tank	P0462	Detects low voltage readings in the fuel level primary tank sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 1	<	0.20	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
SRC high for fuel level sensor of primary tank	P0463	Detects high voltage readings in the fuel level primary tank sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 1	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
							and					
							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	B
			or				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 -	whenever enable conditions are met	
					and			
					Engine Running	= TRUE -		
					and			
					duty cycle of the Intake Air Heater output	< 5.00 %		
					and			
					battery voltage	>= 11.00 V		
					and			
					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.		battery voltage	> 11.00 V	fail conditions exists for 3 s test performed continuously 0.02 s rate	B
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					ignition on	= TRUE -		
					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.		battery voltage	> 11.00 V	fail conditions exists for 1 s test performed continuously 0.02 s rate	
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					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	-		
Cooling Fan System Performance	P0483	Detects inability to control fan speed to desired RPM	fan speed difference between actual and commanded value	<=	-500.00	rpm	PWM of fan driver output	>=	28.00	%	fail conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or fan speed difference between actual and commanded value	>=	500.00	rpm	and Commanded fan speed	>=	999.00	rpm		
			or fan speed difference between actual and commanded value, unfiltered	<=	-500.00	rpm	and (					
			or fan speed difference between actual and commanded value, unfiltered	>=	500.00	rpm	fan input speed means Fan input speed is calculated by the engine speed * the pulley ratio	<	5320.00	rpm		
							and fan input speed means Fan input speed is calculated by the engine speed * the pulley ratio)	>	400.00	rpm		
							and engine coolant temperature	>	69.96	°C		
							and fan drive speed rate of change	<	2000.00	rpm		
							and fan speed weight factor calculated out of ((a) * (b) * (c) * (d)	>	0.59	factor		
							with (a) factor based on input shaft stability (see Look-Up-Table #32)	=	0 to 1	factor		
							and with (b) factor based on intake air temperature (see Look-Up-Table #35)	=	0 to 1	factor		
							and with (c) factor based on engine coolant temperature (see Look-Up-Table #34)	=	0 to 1	factor		
							and with (d) factor based on fan drive speed (see Look-Up-Table #33))	=	0 to 1	factor		
							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) Motor Control Circuit 1 Low Voltage	P0489	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	EGR Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	P0490	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	EGR Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
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 #36) for Error counter	> 400 to 1500 rpm >= 800.00 counts	fluid volume in Clutch (see Look-Up-Table #37) calculated by a model where fluid flow in and fluid flow out are calculated. The fluid flow in model is based on fan output speed. The fluid out model is based on fluid temperature and the difference between fan input and output speed. or	< 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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			equivalent to 80 sec				Maximum allowed clutch pump out time	>=	600 to 65534	sec		
							when					
							{					
							input fan speed	>	1500.00	rpm		
							means					
							Fan input speed is calculated by the engine speed * the pulley ratio					
							and					
							(					
							PWM of fan driver output	<=	45.00	%		
							and					
							Commanded fan speed	<	600.00	rpm		
							)					
							and					
							ambient pressure	>	55.00	kPa		
							and					
							intake air temperature	>	-40.04	°C		
							and					
							time since engine off	>	0.00	sec		
							and					
							(					
							Engine Running	=	TRUE	-		
							for					
							time	>	0.00	sec		
							)					
							}					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Control Position Not Learned	P049D	Detects adaptation values of EGR bypass 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	=	measured parameter	-	engine coolant temperature	>=	5.06	°C		
			and with				and					
		Only the closed position is learned.	(b) minimum learned offset value for EGR valve	=	measured parameter	-	engine coolant temperature	<=	130.06	°C		
			or				)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		The learn procedure includes 3 actual learns. i.e. the valve is commanded open then closed, then the closed position is read for learn. Then position is commanded open, then closed a 2nd time, and the closed position is read for learn. Then position is commanded open and closed a 3rd time, and closed position is read for learn.					and					
		The maximum and minimum learned offset referrs to the maximum and minimum learned values of the 3 learns performed within total learn procedure.					(					
							battery voltage	>=	10.00	V		
							and					
			Path 2:				battery voltage	<=	30.00	V		
			(				)					
			learned offset value for EGR valve in the present driving cycle	>	23.33	%	and					
			or				EGR sweep has ended - no movement in EGR valve	=	TRUE	-		
			learned offset value for EGR valve in the present driving cycle	<	-23.33	%	means					
			)				the EGR valve cleaning procedure (cycle the valve fully open, fully close 10 times) is performed before the learn starts (in after-run). This signal (EGR sweep has ended) indicates that this cleaning procedure is complete.					
							and					
							engine post drive/ afterun	=	TRUE	-		
							and					
							engine was running during last driving cycle	=	TRUE	-		
							means					
							engine running during last driving cycle	=	TRUE	-		
							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	
			EGR valve stuck during opening	=	TRUE	-	EGR valve is opening	=	TRUE	-	0.005 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			means				or				monitor runs with 0.005 s rate whenever enable conditions are met	
			(				**Path 2:**					
			(a) + (b)	>=	20.01	%	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	-		
			or				and					
			(a) - (c)	<=	0.01	%	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 (refers to last measured valve position in the previous raster calculation)	=	measured parameter	-						
			)									
			for									
			time	>	5.00	sec						
			or									
			Path 2:									
			EGR valve stuck during closing	=	TRUE	-						
			means									
			(									
			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	=	0.50	factor						
			or									
			|(c) - (d)|	>	0.02	%						
			with									
			(c) position of EGR valve	=	measured parameter	-						
			and with									
			(d) position of EGR valve of previous process cycle (refers to last measured valve position in the previous raster calculation)	=	measured parameter	-						
			)									
			for									
			time	>	5.00	sec						
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 Running	=	TRUE	-	fail conditions exists for 20 s monitor runs with 0.1 s rate	B
			with				and					
			(a) minimum engine speed	=	300.00	rpm	(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and with				engine coolant temperature	>	-7.04	°C	whenever enable conditions are met	
			(b) minimum idle speed setpoint (see table #91 for commanded) minimum idle speed	=	calculated parameter	-	and					
			and with				engine coolant temperature	<	129.96	°C		
			(c) factor for calculation of engine speed interval	=	24.00	%	)					
							and					
							idle speed controller active active when TCC not in lock up and when the commanded pedal torque is less than idle governor torque	=	TRUE	-		
							and					
							vehicle speed	<	1.86	mph		
							and					
							no other torque demanding function active means no torque demand based on accelerator pedal input	=	TRUE	-		
							and					
							setpoint torque of the speed controller	>	0	NM		
							and					
							measured engine speed	>	300.00	rpm		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 Running	=	TRUE	-	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	=	2500.00	rpm	(					
			and with				engine coolant temperature	>	-7.04	°C		
			(b) minimum idle speed setpoint (see table #91 for commanded) minimum idle speed	=	calculated parameter	-	and					
			and with				engine coolant temperature	<	129.96	°C		
			(c) factor for calculation of engine speed interval	=	24.00	%	)					
							and					
							idle speed controller active active when TCC not in lock up and when the commanded pedal torque is less than idle governor torque	=	TRUE	-		
							and					
							vehicle speed	<	1.86	mph		
							and					
							no other torque demanding function active means	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							no torque demand based on accelerator pedal input					
							and					
							setpoint torque of the speed controller	>	0	NM		
							and					
							measured engine speed	>	300.00	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.	**Path 1:**				engine speed	>	550.00	rpm	fail conditions exists for 3 s monitor runs with 0.020 s rate whenever enable conditions are met	B
			period is too long to measure	>	0.21	sec	and					
			and				{					
			(				(					
			current state of the signal received from fan is low	=	TRUE	-	PWM of fan driver output	>=	45.00	%		
			)				and					
							Commanded fan speed	>=	0.00	rpm		
			or				)					
							for					
			Path 2:				time	>	30.00	sec		
			period is too long to measure	>	0.21	sec	or					
			and				vehicle speed	<	203.65	mph		
			(				for					
			current state of the signal received from fan is high	=	TRUE	-	time	>	327.67	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 Low Voltage	P0545	Detects low voltage readings on the EGT 1 circuit, indicating an OOR low condition on the EGT circuit	voltage of the temperature sensor upstream of oxidation catalyst	<	0.65	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	>	0.00	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 High Voltage	P0546	Detects high voltage readings on the EGT 1 circuit, indicating an OOR high condition on the EGT 1 circuit	voltage of the temperature sensor upstream of oxidation catalyst	>	2.21	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 temperature upstream of oxidation catalyst	>	1000	°C	for time	>	0.00	sec		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Idle Control System	P054E	Quantity Threshold - Fuel Quantity Lower Than Expected	(				(				fail conditions exists for 15 s monitor runs 0.2 s rate whenever enable conditions are met	B
			Current injection quantity	<	minimum expected injection quantity (map) * factor for calculating the minimum threshold out of the reference map	mm^3/rev	Current gear	=	unchanged	-		
			with Current gear	≠	Neutral		AND Vehicle speed	<=	1.86	mph		
			and minimum expected injection quantity (see Look-Up Table #96)	=	46.0 to 161.6	mm^3/rev	AND Particulate filter regeneration	=	not active			
			and factor for calculating the minimum threshold out of the reference map)	=	0.50	factor	AND Engine speed	<=	1040.00	rpm		
							AND Engine speed	>=	448.00	rpm		
							AND Engine coolant temperature	>	-20.04	°C		
							AND Idle speed controller	=	active	-		
							all for time	>	5.00	sec		
							) AND Fluctuation range of engine speed (calculates the delta RPM from the max idle speed seen from the min idle speed seen and if this delta is less then this calibration value it will release the monitor)	<	16383.50	rpm		
							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.
	P054F	Quantity Threshold - Fuel Quantity Higher Than Expected	Current injection quantity	<	maximum expected injection quantity (map) * factor for calculating the maximum threshold out of the reference map	mm^3/rev	(				fail conditions exists for 15 s monitor runs 0.2 s rate whenever enable conditions are met	B
			with Current gear	≠	Neutral		Current gear	=	unchanged	-		
			and				AND					
			maximum expected injection quantity (see Look-Up-Table #50)	=	122.8 to 244.4	mm^3/rev	Vehicle speed	<=	1.86	mph		
			and				AND					
			factor for calculating the maximum threshold out of the reference map	=	1.50	factor	Particulate filter regeneration	=	not active			
			)				AND					
							Engine speed	<=	1040.00	rpm		
							AND					
							Engine speed	>=	448.00	rpm		
							AND					
							Engine coolant temperature	>	-20.04	°C		
							AND					
							Idle speed controller	=	active	-		
							all for time	>	5.00	sec		
							)					
							AND					
							Fluctuation range of engine speed (calculates the delta RPM from the max idle speed seen from the min idle speed seen and if this delta is less then this calibration value it will release the monitor)	<	16383.50	rpm		
							AND					
							Basic enable conditions met	=	see sheet enable tables	-		
Cruise Control Multi-Function Input "A" Circuit	P0564	Cruise switch status indicated not in "between range" for calibrated period of time.	Set Switch CAN message value "Between Ranges"	=	9	-	ignition on	=	TRUE	-	fail conditions exists for 5 sec 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 "On" Signal	P0565	If the Cruise ON switch is continuously applied for greater than a calibratable time	Set Switch CAN message value "Cruise On"	=	5	-	ignition on	=	TRUE	-	fail conditions exists for 20s 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 "Resume" Signal	P0567	Resume switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	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	-		
Cruise Control "Set" Signal	P0568	Set switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	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 "Cancel" Signal	P056C	Cruise Control CANCEL switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	Set Switch CAN message value "CANCEL"	=	6	-	ignition on	=	TRUE	-	fail conditions exists for 20s monitor runs with 0.005 s rate whenever enable	Special C
							and input circuit active	=	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	-	conditions are met	
							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	>=	3.00	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	=	10.00	counts	input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Brake Pedal Position Sensor "A" Circuit Range/Performance	P057B	Compare maximum delta of analog brake pedal sensor with a threshold	EWMA filtered test result based on the difference of |(a) - (b)|	<=	0.40	factor	following conditions for time:	>	4	sec	monitor runs 0.02 s rate whenever enable conditions are met	A
			where				(					
			(a) maximum analog brake sensor raw voltage during test	=	calculated parameter	V	ignition on	=	TRUE	-		
			(b) minimum analog brake sensor raw voltage during test	=	calculated parameter	V	and					
			where				starter is active cranking	=	FALSE	-		
			difference of the brake sensor voltage corresponds to a corrected value of (see Look-Up-Table #14)	=	0 to 1	factor	for					
							time	>	3.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							)					
							and					
							gear has been in Park during this driving cycle	=	TRUE	-		
							full test has not been completed this driving cycle	=	TRUE	-		
							gear selector currently not in Park	=	TRUE	-		
							vehicle speed	>=	4.35	mph		
							accelerator pedal position 1	<	5.00	%		
							and					
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							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	-		
Brake Pedal Position Sensor "A" Circuit Low	P057C	Brake pedal position sensor voltage below a threshold for a calibrated period of time indicating an OOR low	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 No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Brake Pedal Position Sensor "A" Circuit High	P057D	Brake pedal position sensor voltage above a threshold for a calibrated period of time indicating an OOR high	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 No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Cruise Control Multi-Function Input "A" Circuit Low	P0580	Cruise switch status in Open/short circuit to ground for a calibrated period of time	Set Switch CAN message value "Open/Short to Ground"	=	7	-	ignition on	=	TRUE	-	fail conditions exists for 20s 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 Multi-Function Input "A" Circuit High	P0581	Cruise switch status in"short circuit to Power" for a calibrated period of time	Set Switch CAN message value "Short to Power"	=	8	-	ignition on	=	TRUE	-	fail conditions exists for 2.5s monitor runs with 0.005 s rate	Special C
							and input circuit active and	=	TRUE	-		

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	-	whenever enable conditions are met	
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 test performed once per drive cycle during afterrun	A
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	-		

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 and detects the improper operation of the ECM. This is accomplished by monitoring the output of various hardware modules within the ECM and by creating parallel redundant calculations of critical engine management system parameters. These redundant calculations are compared to the respective values of the primary function or to fixed limits to evaluate the monitoring path. A failure of these monitoring paths would for example be caused by a corrupt RAM cell leading to an implausible value for a parameter.	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	>	523.00	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			
			internal supply voltage	<	4.2	V	ignition on	=	TRUE	-	fail conditions exists for 0.08s monitor runs	
			or				and					
			internal supply voltage	>	5.25	V	counter of reactivation attempt of power output stage	>=	2.00	counts		
							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	-	monitor runs once per trip during pre drive at least twice every 0.08s rate whenever enable conditions are met	
			|(a) - (b)|	>	50.00	usec	programmed energizing time for fuel injection has been read back	=	TRUE	-	fail conditions exists for at least 0.05 s monitor runs with 0.01 s rate whenever enable conditions are met	
			with				means					
			(a) parallel redundant calculation of energizing time for fuel injection	=	calculated parameter	-	programmed energizing time for fuel injection	>=	0	-		
			and with				and					
			(b) parallel redundant calculation of programmed energizing time for fuel injection	=	calculated parameter	-	measured energizing time for fuel injection has been read back	=	TRUE	-		
							means					
							measured energizing time for fuel injection	>=	0	-		
							and					
							engine speed	>	1200.00	rpm		
							and					
							rail pressure	>	20000.00	kPa		
							and					
							engine test active via diagnosis tester	=	FALSE	-		
							and					
			Path 1:				engine speed	>	1200.00	rpm	fail conditions exists for at least 0.05 s monitor runs with 0.01 s rate whenever enable conditions are met	
			(				and					
			parallel redundant calculation of angle for pilot injection 1 quantity	<	-32.98	degrees	engine test active via diagnosis tester	=	FALSE	-		
			or									
			parallel redundant calculation of angle for pilot injection 1 quantity	>	102.99	degrees						
			)									
			or									
			Path 2:									
			(									
			parallel redundant calculation of angle for main injection quantity	<	-32.98	degrees						
			or									
			parallel redundant calculation of angle for main injection quantity	>	43.53	degrees						
			)									
			or									
			Path 3:									
			(									
			parallel redundant calculation of angle for post injection quantity 1	<	-360.00	degrees						
			or									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			parallel redundant calculation of angle for post injection quantity 1	>	-67.00	degrees						
			)									
			or									
			Path 4:									
			(									
			parallel redundant calculation of angle for post injection quantity 2	<	-83.00	degrees						
			or									
			parallel redundant calculation of angle for post injection quantity 2	>	43.53	degrees						
			)									
			or									
			Path 5:									
			(									
			parallel redundant calculation of angle for post injection quantity 3	<	-83.00	degrees						
			or									
			parallel redundant calculation of angle for post injection quantity 3	>	0.00	degrees						
			)									
			(				redundant engine speed calculation	>=	1200.00	rpm	fail conditions exists for at least 0.2 s monitor runs with 0.04 s rate whenever enable conditions are met	
			parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-Table #56)	<	-500 to -50	usec	and					
			or				engine test active via diagnosis tester	=	FALSE	-		
			parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-Table #55)	>	50 to 500	usec						
			)									
			parallel redundant calculation of post injection 2 quantity	>	130.00	mm^3	engine test active via diagnosis tester	=	FALSE	-	fail conditions exists for at least 0.4 s monitor runs with 0.04 s rate whenever enable conditions are met	
							and					
							change in injection operation mode requested	=	TRUE	-		
			parallel redundant calculation of averaged torque creating energizing time per cylinder (see Look-Up-Table #58)	>	200 to 6000	us	fuel system is in fuel cut off (see parameter definition line #189)	=	TRUE	-	fail conditions exists for at least 0.8 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and				for					
			activation counter (intervention) of the surge damper	>=	74.00	counts	time	>	0.65	sec	monitor runs with 0.04 s rate whenever enable conditions are met	
							and					
							redundant engine speed calculation	>	1440.00	rpm		
							and					
							general engine speed demand (see parameter definition line #213)	=	FALSE	-		
							and					
							external torque demand from stability ECU via CAN	=	FALSE	-		
							and					
							external torque demand from transmission ECU via CAN	=	FALSE	-		
							and					
							((					
							cruise control active	=	FALSE	-		
							or					
							(					
							brake pedal status	=	TRUE	-		
							or					
							redundant brake pedal status	=	TRUE	-		
							)					
							for					
							time	>	0.28	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	>	120.00	rpm		
							and					
							redundant engine speed calculation at start (see Look-Up-Table #57)	>	840 to 1120	rpm		
							)					
							and					
							engine test active via diagnosis tester	=	FALSE	-		
			parallel redundant calculation of averaged wave correction quantity for pilot injection	>=	7.50	mm^3	redundant engine speed calculation	>=	1200.00	rpm	fail conditions exists for at least 0.2 s monitor runs with 0.04 s rate whenever enable conditions are met	
			or				and					
			parallel redundant calculation of averaged wave correction quantity for main injection	>=	7.50	mm^3	engine test is active via diagnosis tester	=	FALSE	-		
			or									
			parallel redundant calculation of averaged wave correction quantity for post injection 2	>=	7.50	mm^3						
			or									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			parallel redundant calculation of averaged wave correction quantity for post injection 3	>=	7.50	mm^3						
			(				(				fail conditions exists for 0.120 s monitor runs with 0.01 s rate whenever enable conditions are met	
			rail pressure	<=	16000.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	<	0.19	V		
			or				or					
			rail pressure	>=	204000.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	>	4.81	V		
							)					
							and					
							delay time	>	0.21	sec		
							and					
							parallel redundant calculation of injections active	=	TRUE	-		
							and					
							redundant engine speed calculation	>	1000.00	rpm		
							and					
							engine test active via diagnosis tester	=	FALSE	-		
							and					
							conditions for level one signal range check fault detection are met	=	TRUE	-		
			internal supply voltage	<	4.2	V	ignition on	=	TRUE	-	fail conditions exists for 0.05 s test performed continuously with 0.01 s rate	
			or									
			internal supply voltage	>	5.25	V						
			WDA (watch dog) shut off due to undervoltage	=	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	
			means				and					
			internal supply voltage	<	4.2	V	battery voltage	>	8.00	V		
							for					
							time	>	0.10	sec		
							and					
							WDA (watch daog) line active	=	TRUE			
			WDA (watch dog) shut off due to overvoltage	=	TRUE	-	shut off path test active	=	FALSE	-	fail conditions exists for 0.01 s	
			means				and					
			internal supply voltage	>	5.25	V	WDA (watch daog) 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.
							monitor runs with 0.01 s rate whenever enable conditions are met	
			WDA (watch dog) shut off due to internal security error	= TRUE -	shut off path test active and WDA (watch daog) line active	= FALSE - = TRUE -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			WDA (watch dog) shut off because of corrupt question-and-answer communication	= TRUE -	ignition on and WDA (watch dog) line active and shut off path test active	= TRUE - = TRUE - = FALSE -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			the actual response time from processor is not equal to the requested response-time	= TRUE -	ignition on and NO Pending or Confirmed DTCs:	= TRUE - = see sheet inhibit tables -	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											conditions	
											are met	
			redundant, independent algorithm for								fail	
			plausibility fault of accelerator pedal								conditions	
			signal for safety reasons:								exists for	
			Path 1:				ignition on	=	TRUE	-	0.28 s	
			|(maximum (a) (b)) - 2 * (maximum (c)	>	0.29	V	and				monitor runs	
			(b))|								with 0.04 s	
			with				engine test active via diagnosis tester	=	FALSE	-	rate	
			(a) voltage accelerator pedal 1				and				whenever	
			and with				Input signal fault present	=	FALSE	-	enable	
			(b) lower limit for accelerator pedal		0.95	V	and				conditions	
			voltage								are met	
			and with				ADC fault present	=	FALSE	-		
			(c) voltage accelerator pedal 2									
			and									
			(									
			voltage accelerator pedal 1	>	1.45	V						
			or									
			voltage accelerator pedal 2	>	1.45	V						
			)									
			or									
			Path 2:									
			|(maximum (a) (b)) - 2 * (maximum (c)	>	0.41	V						
			(b))|									
			with									
			(a) voltage accelerator pedal 1									
			and with									
			(b) lower limit for accelerator pedal		0.95	V						
			voltage									
			and with									
			(c) voltage accelerator pedal 2									
			and									
			(									
			voltage accelerator pedal 1	<=	1.45	V						
			or									
			voltage accelerator pedal 2	<=	1.45	V						
			)									
			no response to an injection request	=	TRUE	-	ignition on	=	TRUE	-	fail	
			processor internal				and				conditions	
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	exists for	
											more than	
											0.08 s	
											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.
			no response to shut-off path test processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= =	TRUE see sheet inhibit tables	- -	fail conditions exists for more than 0.523 monitor runs at the 0.01 s rate whenever enable	
			no response to hardware activation request processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= =	TRUE see sheet inhibit tables	- -	fail conditions exists for more than 0.437 monitor runs at least twice every 0.08 s rate whenever enable	
			no response from processor operative system processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= =	TRUE see sheet inhibit tables	- -	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			Path 1: repetitions of injection shut-off path test or Path 2: (number of a powerstage test too few and number of cylinders)	 >= < >=	 523.00 2.00 8.00	 counts counts counts	ignition on and injection shut-off path test	= =	TRUE ACTIVE	- -	fail conditions exists for more than 0.64 s 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.
			too few bytes received by monitoring module from CPU means bytes received by monitoring module from CPU as response	= <	TRUE 4	- Bytes	ignition on	=	TRUE	-	fail conditions exists for more than 0.4 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			ECM detects interruption in the SPI communication processor internal	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 0.08 s 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 on	=	TRUE	-	fail conditions exists for more than 0.2 s 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 redundant filtered supply voltage to injector chip 1	< >	3.10 3.50	V V	ignition on and battery voltage and basic enable conditions met:	= >	TRUE 8.00 see sheet enable tables	- V -	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 or redundant filtered supply voltage to injector chip 2	< >	3.10 3.50	V V	ignition on and battery voltage and basic enable conditions met:	= >	TRUE 8.00 see sheet enable tables	- V -	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			internal injector driver chip 1 error IC internal	=	TRUE	-	Engine Running and basic enable conditions met:	=	TRUE see sheet enable tables	- -	fail conditions exists for more than 0.1 s monitor runs with 0.01 s rate whenever enable conditions are met	
			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 0.1 s monitor runs with 0.01 s rate whenever enable conditions	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							conditions are met	
			piezo injector actuator internal feedback voltage or piezo injector actuator internal feedback voltage	< 0.00 V > 3.30 V	main injection	= ACTIVE -	fail conditions exists for more than 0.1 s monitor runs with 0.01 s rate whenever enable conditions are met	
			Path 1: engine speed or Path 2: engine speed	 > 1500.00 rpm > 1600.00 rpm	injection cut off demand from ECM internal monitoring	= TRUE -	fail conditions exists for 0.02 s test performed continuously with 0.02 s	
			security torque limitation request due to implausible air system control requests	= TRUE -	ignition on	= TRUE -	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
			security torque limitation request due to implausible rail pressure request	= TRUE -	ignition on	= TRUE -	fail conditions exists for more than 533 events test performed continuously with 0.01 s	

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	=	TRUE	-	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
			indicated torque	>	(a) + (b) + (c) + (d)	-	Engine Running	=	TRUE	-	fail conditions exists for more than 0.28 s monitor runs with 0.04 s rate whenever enable conditions are met	
			with (a) modeled inner engine torque	=	calculated parameter	-	and basic enable conditions met:	=	see sheet enable tables	-		
			and with (b) torque tolerance offset (see Look-Up-Table #54)		11.72 to 99.61	%						
			and with (c) torque of engine speed controller	=	calculated parameter	-						
			and with (d) torque of surge damper control	=	calculated parameter	-						
			voltage of charging switch	>	210.00	V	ECM is in startup before injections are released	=	TRUE	-	fail conditions exists for more than 4 events monitor runs with 0.01 s rate whenever enable conditions are met	
			or voltage of charging switch if buffer of a bank is not charged completely, or not at all	>	100.00	V						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			error at startup of DC/DC converter of one bank	=	TRUE	-	ignition on and DC/DC converter is in startup	= =	TRUE TRUE	- -	fail conditions exists for 0.01 ms monitor runs with 0.01 s rate whenever enable conditions are met	
			DC/DC converter cannot be switched off.	=	TRUE	-	ignition on	=	TRUE	-		
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 test performed once per drive cycle during afterrun	A
Control Module Analog to Digital Performance	P060B	Redundant electronic ECM circuitry determines if ADC is correctly converting signals within the correct time periods.	voltage at ADC test voltage input or voltage at ADC test voltage input	< > 	4.73 4.83	V V	ignition on	=	TRUE	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	A
			|(a) - (b)| with (a) voltage accelerator pedal signal 2 at internal ADC	> =	0.16 measured parameter	V V	ignition on and (	=	TRUE	-	fail conditions exists for at least 0.12 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				counter for steady state detection of the internal AD converter	>=	4.00	events	monitor runs with 0.01 s rate whenever enable conditions are met	
			(b) voltage accelerator pedal signal 2 at external ADC	=	measured parameter	V	means					
							|(a) - (b)|	<=	0.06	V		
							with					
							(a) voltage accelerator pedal signal 2 at internal ADC	=	measured parameter	V		
							and with					
							(b) voltage of the accelerator pedal signal 2 at the external ADC	=	measured parameter	V		
							or					
							counter for steady state detection of the external AD converter	>=	4.00	events		
							means					
							(c) - (d)	<=	0.06	V		
							with					
							(c) voltage accelerator pedal signal 2 at external ADC	=	measured parameter	V		
							and with					
							(d) voltage of the accelerator pedal signal 2 at the internal ADC	=	measured parameter	V		
							)					
			(				ignition on	=	TRUE	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	
			ratio metric correction factor	<	0.62	factor						
			or									
			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)|	>=	400.00	rpm	redundant calculated engine speed	>=	600.00	rpm	fail conditions exists for more than 0.32 s monitor runs with 0.04 s rate whenever enable conditions are met	A
			with				and					
			(a) redundant calculated engine speed	=	calculated parameter	-	engine synchronization	=	TRUE	-		
			and with				engine synchronization completed	=	TRUE	-		
			(b) engine speed	=	measured parameter	-	which means					
							number of crankshaft revolutions	>=	4.00	revs		
							and					
							crankshaft reference mark detected	=	TRUE	-		
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)					

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 -		
Fuel Pre-supply Pump Control Circuit Open	P0627	Diagnoses the Fuel Pre-Supply Pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	engine post drive/ afterun	= FALSE -	fail conditions exists for 1.99s monitor runs with 0.2 s rate whenever enable conditions are met	B
					for time	> 1.00 sec		
					and			
					battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and			
					(			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					)			
Fuel Pre-supply Pump Control Circuit Low Voltage	P0628	Diagnoses the Fuel Pre-Supply Pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	engine post drive/ afterun	= FALSE -	fail conditions exists for 1s monitor runs with 0.2 s rate whenever enable conditions are met	B
					for time	> 1.00 sec		
					and			
					battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and			
					(			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					)			
Fuel Pre-supply Pump Control Circuit High Voltage	P0629	Diagnoses the Fuel Pre-Supply Pump low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	engine post drive/ afterun	= FALSE -	fail conditions exists for 2 s monitor runs with 0.2 s rate whenever enable	B
					for			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time and battery voltage for time and (ignition on and basic enable conditions met:)	> > > = =	1.00 11.00 3.00 TRUE see sheet enable tables	sec V sec - -	conditions are met	
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: unable to erase or change whole EEPROM sector or read order is not successfully accomplished for more than amount of blocks or amount of write errors in current block	 = = =	 TRUE 3 3	 - counts counts	ignition on and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 0.01 s test performed continuously at the 0.01 s rate	A
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 and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
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 and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A

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 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 and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
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 and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 1.0 s test performed continuously 0.01s rate	B
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	Diagnoses the Malfunction Indicator Lamp (MIL) low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	circuit active at low current and ignition on and	= =	TRUE TRUE	- -	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	B (No MIL)

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 for time and ECU Shutdown tasks in progress for time and Battery voltage for time and basic enable conditions met:	= FALSE - > 1.00 sec = FALSE - > 1.00 sec > 10.50 V > 3.00 sec = see sheet enable tables -		
		Diagnoses the Malfunction Indicator Lamp (MIL) low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	lamp is commanded off and ignition on and ECU Initialization tasks in progress for time and ECU Shutdown tasks in progress for time and Battery voltage for time and basic enable conditions met:	= TRUE - = TRUE - = FALSE - > 1.00 sec = FALSE - > 1.00 sec > 10.50 V > 3.00 sec = see sheet enable tables -	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	B (No MIL)
		Diagnoses the Malfunction Indicator Lamp (MIL) low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	circuit active at low current and ignition on and ECU Initialization tasks in progress for time and ECU Shutdown tasks in progress for time	= TRUE - = TRUE - = FALSE - > 1.00 sec = FALSE - > 1.00 sec	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B (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 for time and basic enable conditions met:	 > > 	 10.50 3.00 see sheet enable tables	 V sec -		
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 the MIL	=	TRUE	-	ignition on for time and new message is received via CAN and basic enable conditions met and NO Pending or Confirmed DTCs:	= > = = =	TRUE 0.25 TRUE see sheet enable tables see sheet inhibit tables	- sec - - -	fail conditions exists for 1 s test performed continuously 0.5 s rate	A (No MIL)
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	-	(battery voltage and battery voltage) and engine speed and (selected gear position is park or selected gear position is neutral) and basic enable conditions met: and NO Pending or Confirmed DTCs:	 >= <= <= = = = =	 11.00 655.34 7000.00 TRUE TRUE see sheet enable tables see sheet inhibit tables	 V V rpm - - - -	fail conditions exist for more than 3000 events 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.
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	>=	8.00	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 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	Diagnoses the Ruductant Pump Motor high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and (battery voltage correction factor (please see the parameter definition (please see the parameter definition	>	0.00	factor		
							and battery voltage correction factor (please see the parameter definition (please see the parameter definition)	<	4.00	factor		
							for time	>	3.00	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.
Reductant Pump High Control Circuit High Voltage	P1044	Diagnoses the Ruductant Pump Motor high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Purge Valve High Control Circuit High Voltage	P1046	Diagnoses the Reductant Purge Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	B
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					time and basic enable conditions met: and NO Pending or Confirmed DTCs:	> 3.00 sec = see sheet enable tables - = see sheet inhibit tables -		
Reductant Injector High Control Circuit Low Voltage	P1048	Diagnoses the Reductant Injector high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground) OR Output current to dosing valve	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground - > 1.60 Amps	ECU initialization tasks in progress for time and battery voltage for time and battery voltage for time and (battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition) for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	= FALSE - > 1.00 sec > 11.00 V > 3.00 sec < 655.34 V > 3.00 sec > 0.00 factor < 4.00 factor > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
Reductant Injector High Control Circuit High Voltage	P1049	Diagnoses the Reductant Injector high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power) OR Output current to dosing valve	= Short to power: ≤ 0.5 Ω impedance between signal and controller power - < 0.10 Amps	ECU initialization tasks in progress for time and battery voltage for time and battery voltage for	= FALSE - > 1.00 sec > 11.00 V > 3.00 sec < 655.34 V	fail conditions exists for 3 s monitor runs with 10 msec 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.
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Rail Pressure Performance	P1089	Measured rail pressure is checked against desired rail pressure to detect high rail pressure deviations in fuel cut-off	rail pressure deviation from setpoint calculated as the absolute value of difference between desired and actual value as an enable condition for injection timing correction learning	>	5000.00	kPa	rail pressure control commanded during injection timing correction learning phase	=	TRUE	-	fail conditions exists for 720 crank revolutions monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							NO Pending or Confirmed DTCs limiting rail pressure set point	=	see sheet inhibit tables	-		
							for time	>	2.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	P10CC	Diagnoses the Exhaust Aftertreatment Fuel Injector low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power		engine pre drive	=	FALSE	-	fail conditions exists for more than 5 events monitor runs with 0.1 s rate whenever enable conditions are met	B
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3.00	sec		
							and					
							Diesel dosing valve: fuel injection	=	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	-		
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 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	P10CE	Diagnoses the Exhaust Aftertreatment Fuel Injector high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	engine pre drive	=	FALSE	-	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
Charge Air Cooler Temperature Sensor Performance	P10CF	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:**				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable	B
			|(a) - (b)| (see Look-Up-Table #3) with	>	100 to 999	°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.
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-	and				conditions are met	
							engine speed (see Look-Up-Table #3) for	>	530 to 870	rpm		
			(b) captured charge air cooler upstream temperature at start	=	measured parameter	-						
							time	>	0.00	sec		
							and					
			or				engine post drive/ afterun	=	FALSE	-		
			Path 2:				and					
			(				diagnostic performed in current dc	=	FALSE	-		
			|(a) - (b)| (see Look-Up-Table #3)	<=	100 to 999	°C	and					
			with				basic enable conditions met:	=	see sheet enable tables	-		
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-	and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			(b) captured charge air cooler upstream temperature at start	=	measured parameter	-						
			and									
			|(a) - (b)| (see Look-Up-Table #6)	>	27 to 999	°C						
			with									
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-						
			(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	-						
			)									
Reductant Injector Temperature - Exhaust Gas Temperature 2 Correlation	P10D0	Detects an implausible SCR dosing valve coil temperature by comparing the temperature with a reference temperature	|(a) - (b)| (see Look-Up-Table #90)	>	30 to 3276.7	°C	ignition on	=	TRUE	-	fail conditions exists for 0.1 s monitor with 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) dosing valve coil temperature	=	calculated parameter	°C	state of selective catalytic reduction system	=	STANDBY or NO PRESSURE CONTROL	-		
			and with				and					
			(b) oxidation catalyst downstream temperature	=	measured parameter	°C	active heating phase for dosing valve	=	FALSE	-		
							and					
							valve already activated within this driving cycle	=	FALSE	-		
							and					
							battery voltage	>	11.00	V		
							and					
							ambient temperature	>=	-60.04	°C		
							and					
							engine run time	<	10.00	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 off time and urea pump motor output duty cycle and Max [(a), (b)] - Min [(a), (b)] where (a) ambient temperature (b) oxidation catalyst downstream temperature and urea dosing valve output duty cycle and coil current measurement is valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	> 28800.00 sec = 0.00 % <= 7.00 °C = measured parameter - = measured parameter - > 3.00 % = TRUE - = see sheet enable tables - = see sheet inhibit tables -		
Fuel Temperature Sensor 1 Circuit High	P111F	Detects an error in the fuel pump temperature sensor performance by comparing start-up temperatures between fuel pump temperature and fuel rail temperature	**Path 1:** |(a) - (b)| (see Look-Up-Table #41) where ((a) captured fuel temperature 1 at start and with (b) captured fuel temperature 2 at start) or **Path 2:** |(a) - (b)| (see Look-Up-Table #41) with (a) captured fuel temperature 1 at start and with (b) captured fuel temperature 2 at start and |(a) - (b)| (see Look-Up-Table #42) where (a) captured fuel temperature 1 at start and with (b) captured fuel temperature 2 at start and	> 100 to 999 °C = measured parameter - = measured parameter - <= 100 to 999 °C = measured parameter - = measured parameter - > 20 to 999 °C = measured parameter - = measured parameter -	minimum engine-off time and ambient temperature and engine speed (see Look-Up-Table #91) for time and engine post drive/ afterun and diagnostic performed in current dc and basic enable conditions met: and NO Pending or Confirmed DTCs:	>= 28800.00 sec > -60.04 °C > 600 to 850 rpm > 0.00 sec = FALSE - = FALSE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 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.
			(									
			status of block heater (see parameter definition)	=	FALSE	-						
Exhaust Gas Temperature Sensors 3-4 Not Plausible	P113A	Detects biased urea catalyst temperature sensor by comparing the urea catalyst temperature sensor to the particulate filter temperature sensor after an engine off soak time	|(a) - (b)| (see Look-Up-Table #95)	>	30 to 999	°C	minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			with				and					
			(				Engine Running	=	TRUE	-		
			(a) captured temperature downstream of the urea catalyst at start	=	measured parameter	°C	for					
			and with				time	>	0.00	sec		
			(b) captured temperature downstream of the particulate filter at start	=	measured parameter	°C	and					
			)				engine post drive/ afterun	=	FALSE	-		
							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	-		
HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 1	P11A6	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	>	(a) + (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calcaulted O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.04	factor	commanded fuel injection quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid (see parameter definition at line #273)	=	TRUE	-		
							for time	>	0.50	sec		
							oxidation catalyst upstream temperature	<	999.96	°C		
							oxidation catalyst upstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	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 1	P11A9	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	<	(a) - (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calcaulted O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.04	factor	commanded fuel injection quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid (see parameter definition at line #273)	=	TRUE	-		
							for time	>	0.50	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							oxidation catalyst upstream temperature	<	999.96	°C		
							oxidation catalyst upstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							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	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calcaulted O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.05	factor	commanded fuel injection quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid (see parameter definition at line #273)	=	TRUE	-		
							for time	>	0.50	sec		
							SCR downstream temperature	<	999.96	°C		
							SCR downstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	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	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calcaulted O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.05	factor	commanded fuel injection quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid (see parameter definition at line #273)	=	TRUE	-		
							for time	>	0.50	sec		
							SCR downstream temperature	<	999.96	°C		
							SCR downstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Current Performance Bank 1 Sensor 1	P11B4	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)	<	0.50	ratio	NOx sensor's heater temperature has reached the set point	=	TRUE	-	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							for time	>	2.00	sec		
			where									
			(a) time for which valid lambda signal received over CAN	=	measured parameter	-	Enabling Upstream 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 #49)	<=	0.1 to 10	factor		
							where					
							(a) Reciprocal lambda	=	measured parameter	-		
							(b) Filtered reciprocal lambda	=	calculated parameter	-		
							for time	>	5.00	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
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)	<	0.50	ratio	NOx sensor's heater temperature has reached the set point	=	TRUE	-	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							for time	>	2.00	sec		
			where									
			(a) time for which valid lambda signal received over CAN	=	measured parameter	-	Enabling Upstream 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 #49)	<=	0.1 to 10	factor		
							where					
							(a) Reciprocal lambda	=	measured parameter	-		
							(b) Filtered reciprocal lambda	=	calculated parameter	-		
							for time	>	5.00	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	-	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	B
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							for time	>=	15.00	sec		
							ambient pressure	>=	75.00	kPa		
							ambient pressure	<=	106.00	kPa		
							ambient temperature	>=	-7.04	°C		
							ambient temperature	<=	37.96	°C		
							((					
							filtered modeled Nox concentration percent positive deviation (always enabled -> cal'd out)	<=	0.050048828125	%		
							filtered modeled Nox concentration percent positive deviation (always enabled -> cal'd out)	>=	0.050048828125	%		
							)					
							))					
							for time	>	2.00	sec		
							time since start	>	30.00	sec		
							Engine Coolant Temperature	>=	68.96	°C		
							Engine Coolant Temperature	<=	129.96	°C		
							Exhaust gas temperature range at Upstream Nox sensor (see Look-Up-Table #81)	>0	0 to 1	factor		
							Fuel Injection pattern (see Look-Up-Table #82)	=	0 to 58	pattern		
									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)			
							Ratio of transient factor	>	0.95	factor		
							for time	>	0.50	sec		
							Vehicle speed	>=	37.29	mph		
							for time	>	1.00	sec		
							relative humidity	<=	100.00	%		
							relative humidity	>=	0.00	%		
							Enable range for the plausibility check of Upstream Nox sensor (see Look-Up-Table #74)	≠0	0 to 1	factor		
							for time	>	0.00	sec		
							Air mass per cylinder	>=	0.00	g/rev		
							Air mass per cylinder	<=	6.00	g/rev		
							for time	>	5.00	sec		
							actual valve position of exhaust-gas recirculation	>=	0.00	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							actual valve position of exhaust-gas recirculation	<=	100.00	%		
							for time	>	0.50	sec		
							filtered modeled NOx-concentration upstream of the SCR	>=	0.00	ppm		
							filtered modeled NOx-concentration upstream of the SCR	<=	1650.00	ppm		
							for time	>	0.50	sec		
							Diagnostic has not 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	<	(a) * (b)	-	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	B
			(a) Table for the base value of the lower plausibility limit (see Look-Up-Table #80)	=	-1 to -0.46	-	Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
			(b) Factor correction based on Environmental Pressure	=	1	factor	for time		15.00	sec		
							ambient pressure	>=	75.00	kPa		
							ambient pressure	<=	106.00	kPa		
							ambient temperature	>=	-7.04	°C		
							ambient temperature	<=	37.96	°C		
							((					
							filtered modeled Nox concentration percent positive deviation (always enabled -> cal'd out)	<=	0.05	factor		
							filtered modeled Nox concentration percent positive deviation (always enabled -> cal'd out)	>=	0.05	factor		
							)					
							))					
							for time	>	2.00	sec		
							time since start	>	30.00	sec		
							Engine Coolant Temperature	>=	68.96	°C		
							Engine Coolant Temperature	<=	129.96	°C		
							Exhaust gas temperature range at Upstream Nox sensor (see Look-Up-Table #81)	>0	0 to 1	factor		
							Fuel Injection pattern (see Look-Up-Table #82)	=	0 to 58	pattern		
									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)			
							Ratio of transient factor	>	0.95	factor		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	0.50	sec		
					Vehicle speed	>=	37.29	mph		
					for time	>	1.00	sec		
					relative humidity	<=	100.00	%		
					relative humidity	>=	0.00	%		
					Enable range for the plausibility check of Upstream Nox sensor (see Look-Up-Table #75)	≠0	0 to 1	factor		
					for time	>	0.00	sec		
					Air mass per cylinder	>=	0.00	g/rev		
					Air mass per cylinder	<=	6.00	g/rev		
					for time	>	5.00	sec		
					actual valve position of exhaust-gas recirculation	>=	0.00	%		
					actual valve position of exhaust-gas recirculation	<=	100.00	%		
					for time	>	0.50	sec		
					filtered modeled NOx-concentration upstream of the SCR	>=	0.00	ppm		
					filtered modeled NOx-concentration upstream of the SCR	<=	1650.00	ppm		
					for time	>	0.50	sec		
					Diagnostic has not completed this driving cycle	=	FALSE	-		
					NO Pending or Confirmed DTCs		see sheet inhibit tables	-		
					basic enable conditions:		see sheet enable tables	-		
Downstream NOx sensor Self diagnostic Bank 1 Sensor 2	P11D7	During the NOx sensor self-diagnostic test, the number of aborted self-diagnostics is monitor. If the self-diagnostic is aborted, by NOx sensor indication, a calibrated number of times the fault is set	number of self-diagnostic abortions of downstream NOx sensor	> 0.00 counts	**Global Release conditions:**				fault exists for more than 3 events; monitor runs at 0.1 s once per trip during the afterrun	B
					time interval between the runs of the diagnostic tests	>	10.00	sec		
					status of downstream NOx sensor validity	=	TRUE	-		
					SCR downstream temperature	>=	-7.04	°C		
					SCR downstream temperature	<=	399.96	°C		
					status of current engine operation system ≠ Post Drive	=	TRUE	-		
					Engine operation mode = normal mode	=	1.00	-		
					engine speed	<=	1500.00	rpm		
					engine speed	>=	0.00	rpm		
					for time		5.00	sec		
					Modeled downstream NOx concentration	<	160.00	ppm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Battery voltage	<=	6553.40	V		
					Battery voltage	>=	10.00	V		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					status of heater temperature validity for downstream Nox sensor	=	True	-		
					(					
					engine speed	<	1200.00	rpm		
					virtual pedal angle	<	10.00	%		
					for time	<=	14400.00	sec		
					With					
					(((					
					SCR downstream temperature	<=	129.96	°C		
					for time	>=	40.00	sec		
					)					
					for time	>=	600.00	sec		
					)					
					((					
					vehicle speed	<=	31.08	mph		
					for time	>=	40.00	sec		
					)					
					for time	>=	600.00	sec		
					))					
					(					
					Status: DFP Regeneration active	=	FALSE	-		
					Or					
					Status: DPF Regeneration not completed	=	FALSE	-		
					)					
					Rising edge of the following conditions:	=	TRUE	-		
					(					
					Ignition key on	=	TRUE	-		
					Engine operation status	=	Running	-		
					)					
					with					
					(					
					Status: DPF Regeneration not completed	=	TRUE	-		
					Status: DFP Regeneration active	=	TRUE	-		
					Engine coolant temperature	<=	59.96	°C		
					))					
					(					
					Ignition key on	=	TRUE	-		
					Or					
					status of over run condition	=	TRUE	-		
					for time	<=	12.00	sec		
					status of over run condition	=	False	-		
					for time	>	20.00	sec		
					)					
					(					
					Estimated HC Load in SCR catalyst	<=	2.00	g		
					Or					
					(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					change of estimated HC Load in SCR catalyst	>=	(a) * (b)	g		
					within time	<	0.20	sec		
					(a) Estimated HC Load limit in SCR catalyst	=	-0.01	g/sec		
					(b) time factor	=	0.20	sec		
					))					
					And					
					(					
					Estimated HC Load in SCR catalyst	>=	32.00	g		
					engine speed	<=	4000.00	rpm		
					engine speed	>=	500.00	rpm		
					SCR downstream temperature	<=	199.96	°C		
					SCR downstream temperature	>=	-40.04	°C		
					((					
					SCR downstream temperature	<=	199.96	°C		
					for time	>=	1.00	sec		
					)					
					for time (see Look-Up-Table #99)	>=	100 to 900	sec		
					)					
					((					
					vehicle speed	<=	44.75	mph		
					for time	>=	1.00	sec		
					)					
					for time (see Look-Up-Table #99)	>=	100 to 900	sec		
					))					
					Additional release conditions:					
					vehicle speed	=	0	mph		
					number of possible test runs in after-run	<	20.00	-		
					Engine operation status = Post Drive	=	TRUE	-		
					for time	>=	100.00	sec		
					for time in ECM afterrun	>=	30.00	sec		
					for time in ECM afterrun	<=	300.00	sec		
					status of heater temperature validity for downstream Nox sensor	=	TRUE	-		
					Status of downstream NOx sensor self-diagnostic abortion (Bit1)	=	2	-		
					Afterrun Conditions:					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					Engine operation status = Post Drive	=	TRUE	-		
					vehicle speed	=	0			
					measured downstream NOx concentration	<=	160.00	ppm		
					DPF regeneration active	=	FALSE	-		
					engine speed	>=	0.00	rpm		
					engine speed	<=	1500.00	rpm		
					NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
					maximum duration in afterrun	<=	300.00	sec		
					minimum duration to start self-diagnostic	<=	100.00	sec		
					number of self-diagnostic attempts	<	20.00	count		
					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 Bank 1 Sensor 1	P11DB	Detects a failure of the feedback performance of upstream NoX sensor	Ratio of invalid upstream Nox sensor status time count (invalid time / total time)	>	0.50	ratio	Sufficient number of valid and invalid NOx status time (sum of valid and invalid Nox status for diagnostic determination)	>=	18.00	sec	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	sec		
							and					
							Upstream 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:	>	45.00	sec		
							battery voltage	>=	11.00	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)	>	20.00	sec		
							and					
							Lambda signal is in steady state condition (see Look-Up-Table #28)	<=	0.1 to 10	-		
							for time	>=	5.00	sec		
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
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	>	0.50	ratio	Sufficient number of valid and invalid downstream NOx sensor status time (sum of valid and invalid Nox status for diagnostic determination)	>=	18.00	sec	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	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:	>	120.00	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	>=	11.00	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)	>	20.00	sec		
					and					
					Downstream Lambda signal is in steady state condition (| measured lambda signal - filtered lambda signal |) (see Look-Up-Table #27)	<=	0.2 to 3.2	-		
					for time	>=	5.00	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	Diagnoses the Injector Cylinder #1 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	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	A
Injector 2 Control Circuit Shorted	P1227	Diagnoses the Injector Cylinder #2 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	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	A
Injector 3 Control Circuit Shorted	P122A	Diagnoses the Injector Cylinder #3 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	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	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											conditions are met	
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.				battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for time	>	3.00	sec		
							and and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and Open Load Diagnosis active	=	FALSE	-		
							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 adaption values to a threshold.	throttle valve control deviation calculated out of difference between desired and actual value	<	-10.00	%	throttle valve controller bypass is active	=	FALSE	-	fail conditions exists for 10.05 s monitor runs once per drivingcycle with 0.005 s rate whenever enable conditions are met	B
			or throttle valve control deviation calculated out of difference between desired and actual value	>	10.00	%	and throttle valve is driven to a mechanical stop	=	FALSE	-		
		The learn procedure includes 3 actual learns. i.e. the valve is commanded open then closed, then the closed position is read for learn. Then position is commanded open, then closed a 2nd time, and the closed position is read for learn. Then position is commanded open and closed a 3rd time, and closed position is read for learn.					and 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.
		The maximum and minimum learned offset referrs to the maximum and minimum learned values of the 3 learns performed within total learn procedure.			and offset learning for the throttle valve was successful in the previous driving cycle and engine post drive/ afterun and basic enable conditions met and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - see sheet enable tables - = see sheet inhibit tables -		
		Detects implausible learned offset values.	**Path 1:** learned throttle valve offset position at open or closed position or learned throttle valve offset position at open or closed position or **Path 2:** difference between the maximum and minimum positions learned at closed position or **Path 3:** difference between the maximum and minimum positions learned at open position	< -20.00 % > 20.00 % > 30.00 % > 30.00 %	(engine temperature and engine temperature) and (battery voltage and battery voltage) and Throttle Valve is not frozen consisting of: (Engine Coolant Temperature or if Engine Coolant Temperature then Engine Coolant Temperature for time) and engine speed and engine post drive/ afterun and basic enable conditions met	>= 4.96 °C <= 130.06 °C >= 8.00 V <= 30.00 V >= 5.06 °C < 5.06 °C > 6.06 °C 10.00 sec = 0 rpm = TRUE - see sheet enable tables -	fail conditions exists for 0.005 s monitor runs once per drivingcycle with 0.005 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.
Intake Air Flow Valve Control Circuit 2 Low Voltage	P122E	Diagnoses the Throttle Valve high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for time	>	3.00	sec		
							and					
							and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and Open Load Diagnosis active	=	FALSE	-		
							and basic enable conditions met	=	see sheet enable tables	-		
Intake Air Flow Valve Control Circuit 2 High Voltage	P122F	Diagnoses the Throttle Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for time	>	3.00	sec		
							and					
							and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and Open Load Diagnosis active	=	FALSE	-		
							and basic enable conditions met	=	see sheet enable tables	-		
Injector 4 Control Circuit Shorted	P1233	Diagnoses the Injector Cylinder #4 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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.
											are met	
Injector 5 Control Circuit Shorted	P1236	Diagnoses the Injector Cylinder #5 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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 6 Control Circuit Shorted	P1239	Diagnoses the Injector Cylinder #6 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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 Shorted	P1242	Diagnoses the Injector Cylinder #7 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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 8 Control Circuit Shorted	P1247	Diagnoses the Injector Cylinder #8 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	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
Fuel Pressure Regulator 2 High Control Circuit Low Voltage	P125A	Diagnoses the Fuel Rail Pressure Regulator #2 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage	> 11.00 V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for time	> 3.00 sec		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					and ignition on	= TRUE -		
					and basic enable conditions met:	= see sheet enable tables -		
Fuel Pressure Regulator 2 High Control Circuit High Voltage	P125B	Diagnoses the Fuel Rail Pressure Regulator #2 high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	(		fail conditions exists for 0.1 s monitor runs with 0.1s rate whenever enable conditions are met	B
					engine speed	= 0 rpm		
					or engine post drive/ afterun	= TRUE -		
					) and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					for time	> 2.00 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	-		
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 #67)	<	0 to 15000	kPa	state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-	fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	A
							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 #72)	<	0 to 15000	kPa	state machine rail pressure control equal to 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 #70)	<	0 to 15000	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	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 NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal to pressure control valve	=	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	-		
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-		
							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:**									B
			Pilot Injection 1 is prohibited due to exceeding the allowed number of injections (see general description for details)	=	TRUE	-	engine operating mode	=	exhaust warm-up	state bit mask	fail conditions exists for 20 revs test performed continuously 0.01 s rate	
							which means:					
			or				Cold Start Injection Monitoring	=	ENABLED	-		
							and					
							engine operating mode state transition	=	FALSE	-		
							and					
			Path 2: Pilot Injection 1 is prohibited due to collision (overlap) with Main Injection and Pilot Injection 2 (see general description	=	TRUE	-	engine coolant temperature	>	16.00	°C		
							and					
							engine coolant temperature	<	71.00	°C		
			or									
			Path 3: Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Pilot	=	TRUE	-						
			or									
			Path 4: Pilot Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details)	=	TRUE	-						
			or									
			Path 5: Pilot Injection 2 is prohibited due to	=	TRUE	-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			collision (overlap) with Pilot Injection 1 (see general description for details) or					
			Path 6: Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Pilot or	= TRUE -				
			Path 7: Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Main or	= TRUE -				
			Path 8: Post Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details) or	= TRUE -				
			Path 9: Post Injection 2 is prohibited due to collision (overlap) with Main Injection and Post Injection 1 (see general description or	= TRUE -				
			Path 10: Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Post or	= 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 and battery voltage for time and starter is active cranking	= ACTIVE - > 11.00 V > 3.00 sec = FALSE -	fail conditions exists for 3 s monitor runs with 0.005 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.
					for time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
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	> 0.32 g/rev	(		fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable conditions are met	B
					ambient pressure	> 74.80 kPa		
					and			
					engine coolant temperature	> 69.96 °C		
					and			
					EGR control is in closed loop	= TRUE -		
					for time	> 1.50 sec		
					and			
					EGR control is active	= TRUE -		
					for time	> 0.00 sec		
					and			
					exhaust gas system regeneration mode	= FALSE -		
					for time	> 5.00 sec		
					and			
					Engine speed	>= 1000.00 rpm		
					Engine speed	<= 2200.00 rpm		
					and			
					injection quantity	>= 80.00 mm^3/rev		
					injection quantity	<= 300.00 mm^3/rev		
					and			
					desired delta air mass flow	> 0.13 g/s		
					desired delta air mass flow	< -0.02 g/s		
					and			
					difference of the air mass	< 0 g/rev		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					for time	> 0.10 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
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	>= -0.32 g/rev	(		fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable	B
					ambient pressure	> 74.80 kPa		
					and			
					engine coolant temperature	> 69.96 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					and				conditions are met	
					EGR control is in closed loop	=	TRUE	-		
					for time	>	1.50	sec		
					and					
					EGR control is active	=	TRUE	-		
					for time	>	0.00	sec		
					and					
					exhaust gas system regeneration mode	=	FALSE	-		
					for time	>	5.00	sec		
					and					
					Engine speed	>=	1450.00	rpm		
					Engine speed	<=	2200.00	rpm		
					and					
					injection quantity	>=	112.00	mm^3/rev		
					injection quantity	<=	300.00	mm^3/rev		
					and					
					desired delta air mass flow	>	0.13	g/s		
					desired delta air mass flow	<	-0.02	g/s		
					and					
					difference of the air mass	<	0	g/rev		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					for time	>	0.10	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage	P140D	Diagnoses the EGR Valve high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	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	>	11.00	V		
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for time	>	3.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P140E	Diagnoses the EGR Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 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.
					and battery voltage for time and starter is active cranking for time and basic enable conditions met:	 > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	whenever enable conditions are met	
Exhaust Gas Recirculation (EGR) Motor Current Performance	P140F	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	EGR Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage	P1411	Diagnoses the EGR Cooler Bypass high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	EGR Cooling Bypass Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 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.
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P1412	Diagnoses the EGR Cooler Bypass high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	EGR Cooling Bypass Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
Exhaust Gas Recirculation (EGR) Motor 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.		EGR Cooling Bypass Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
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.	= -	EGR Cooling Bypass Solenoid Control Circuit and battery voltage for time and starter is active cranking for time	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec	fail conditions exists for 2 s monitor runs with 0.005 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.
							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 #23)	=	0 to 1	-	fail conditions exists for 200 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and deviation from the temperature setpoint for inner control loop	>	maximum of (a) and (b)	-	and release of the exhaust gas temperature outer loop control monitoring	=	TRUE	-		
			(with				means (					
			(a) limitation of the temperature threshold	=	100.00	°C	active operation mode of the inner control loop	=	TRUE	-		
			and with				means (					
			(b) temperature threshold value for maximum deviation	=	100	°C						
							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	>	1.00	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.
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	<=	0.00	-	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 #24)	=	0 to 1	-	fail conditions exists for 200 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and deviation from the temperature setpoint for inner control loop	<	minimum of (a) and (b)	-	and release of the exhaust gas temperature outer loop control monitoring	=	TRUE	-		
			(with (a) limitation of the temperature threshold	=	-100.00	°C	means (active operation mode of the inner control loop	=	TRUE	-		
			and with (b) temperature threshold value for minimum deviation	=	100	°C	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	>	1.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and 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	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(				and				test performed continuously 0.01 s	
			number of messages with rolling count / protection value errors detected	>=	7.00	-	basic enable conditions met:	=	see sheet enable tables	-		
			with				and					
			number of consecutive frames	=	12.00	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			)									
			or									
			Path 2:									
			(									
			internal calculated checksum value for transmission is not equal the received value	=	TRUE	-						
			and									
			number of fault results	>	15.00	-						
			)									
			or									
			Path 3:									
			time since last frame with valid protection value was received from transmission	>	0.08	sec						
Cruise Control Switch Data Integrity	P155A	Cruise switch status indicates "indeterminate" switch state for calibrated period of time.	Set Switch CAN message value "Indeterminate"	=	0	-	ignition on	=	TRUE	-	fail conditions exists for 15.5s 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	-		
Validation Error in messages received in Power Take Off frame	P1591	Rolling counter and protection value evaluation of the power take off frame	number of messages with validation errors	>=	4.00	counts	ignition on	=	TRUE	-	Once the fault is reported there will be no debouncing of the DFC until ignition key state changes from 0 to 1. monitor runs with 0.005 s rate whenever enable	Special C
			in the last number of messages (sliding window) received PTO frames	=	10.00	counts	for time	>=	3.00	sec		
							and					
							Bus off or error passive on CAN	=	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.
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	<= SENT_INFO_LINE_LOW 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 sensor supply error	= TRUE -		
					and 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	>= SENT_INFO_LINE_HIGH 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 sensor supply error	= TRUE -		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
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 no sensor supply error	= TRUE -		
					and NO Pending or Confirmed DTCs:	= see sheet enable tables -		
Cruise Control Switch Status	P1797	Driver Selected Mode Switch 1 State stuck switch	Driver Selected Mode switch status 1	= TRUE -	ignition on	= TRUE -	fail conditions exists for 20 s monitor runs	Special C
					and Frame timeout	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and Bus off or error passive on CAN and) and basic enable conditions met and NO Pending or Confirmed DTCs:	= = =	FALSE see sheet enable tables see sheet inhibit tables	- - -	with 0.005 s rate whenever	
Particulate filter efficiency monitoring	P2002	Statistical evaluation of the present exhaust gas volume flow signal and particulate filter delta pressure signal to determine particulate filter efficiency	particulate filter efficiency factor	>	0.34	factor	Calculated exhaust-gas volume flow in the particulate filter	<	3000.00	m^3/h	fail conditions exists for 0.1s monitor runs with 0.1s rate whenever enable conditions are met	B
							and Calculated exhaust-gas volume flow in the particulate filter	>	600.00	m^3/h		
							and Temperature upstream of the particulate filter	<	799.96	°C		
							and Temperature upstream of the particulate filter	>	499.96	°C		
							and Temperature downstream particulate filter	<	799.96	°C		
							and Temperature downstream particulate filter	>	499.96	°C		
							and Upstream and downstream particulate filter temperature difference	<	300.00	°C		
							and Upstream and downstream particulate filter temperature difference	>	-300.00	°C		
							and Simulated surface temperature, particulate filter	<	799.96	°C		
							and Simulated surface temperature, particulate filter	>	499.96	°C		
							and Basic enable conditions met	=	see sheet enable tables	-		
							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.	>	10.00	counts	Flag for successful measurement of current in opening phase of Reductant Injector (	=	TRUE	-	fault exists for more than 80 injection events;	A

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 Metering control substate of Pressure control state (see definition)	=	TRUE	-	monitor runs with 100 ms rate whenever enable conditions are met	
							(					
							Calculated Reductant Injector coil temperature	>=	-6.64	°C		
							Calculated Reductant Injector coil temperature	<=	99.96	°C		
							)					
							(					
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							)					
							(					
							Reductant Dosing System pump relative pressure	>=	350.00	kPa		
							Reductant Dosing System pump relative pressure	<=	650.00	kPa		
							)					
							(					
							ambient pressure	>=	0.00	kPa		
							ambient pressure	<=	130.00	kPa		
							)					
							(					
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							)					
							(					
							ambient pressure	>	0.00	kPa		
							ambient temperature	>	-30.04	°C		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
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	<	0.65	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	<	- 50	°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	>	2.21	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.050 s rate whenever	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.
			temperature downstream of oxidation catalyst	>	1000	°C	basic enable conditions met:	=	see sheet enable tables	-	enable conditions are met	
Reductant Level Sensor "A" Circuit Range/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 5 s test performed continuously 1 s rate whenever enable conditions are met	B
			which means (				and 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	and					
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied))	=	(1.71 to 3.56)	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			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 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 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 1 s rate whenever	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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											enable conditions are met	
Reductant Level Sensor 1 Circuit High	P203D	Path 1:									fail conditions exists for more than 3 sec. monitor runs with 1 s rate whenever enable conditions are met	A
		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	-		
Reductant Injector Control Circuit	P2047	Diagnoses the Reductant Injector low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	ECU initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and (battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and battery voltage correction factor (please see the parameter definition)	<	4.00	factor		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	3.00	sec		
					and No Pending or confirmed DTCs	=	See sheet inhibit tables	-		
					and basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector Control Circuit Low Voltage	P2048	Diagnoses the Reductant Injector low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	ECU initialization task in progress	=	FALSE	-	fail conditions exists for 2 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	>	1.00	sec		
					and battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and battery voltage	<	655.34	V		
					for time	>	3.00	sec		
					and (battery voltage correction factor (please see the parameter definition	>	0.00	factor		
					and battery voltage correction factor (please see the parameter definition	<	4.00	factor		
					) for time	>	3.00	sec		
					and No Pending or confirmed DTCs	=	See sheet inhibit tables	-		
					and basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector Control Circuit High Voltage	P2049	Diagnoses the Reductant Injector low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	ECU initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable	A
					for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time	>	1.00	sec	conditions are met	
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							No Pending or confirmed DTCs	=	See sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pressure Sensor Circuit Range/Performance	P204B	Pressure difference between baro pressure and unfiltered Reductant pressure is compared to a threshold while the SCR system is in No Pressure Control state	Pressure sensor signal change during No Pressure Control state	>	50.00	kPa	Reductant filling state in the pressure line	<=	0.00	%	fail conditions exists for more than 0.6 sec monitor runs with 0.01 s rate whenever enable conditions are met	A
							and					
							status of SCR control state (please see the definition)	=	No Pressure Control	-		
							and					
							State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
							and					
							ambient pressure	>	0.00	kPa		
							and					
							ambient temperature	>	-30.04	°C		
							and					
							NO Pending or Confirmed DTCs:	=	see shet inhibit tables	-		
							and					
							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	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			same as:		NO Pending or Confirmed DTCs:	= see sheet inhibit tables -	more than 0.4 sec. monitor runs with 0.01 s rate whenever enable	
			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	> 4.80 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	> 800.00 kPa	basic enable conditions met:	= see sheet enable tables -		
Reductant System Performance Bank 1	P204F	Unsuccessful reductant pressure build up	Reductant Pump Module Pressure	<= 350.00 kPa	status of SCR control sub state (please see the definition)	= PRESSURE BUILDUP -	fail conditions exists for 1 event monitor runs with 0.1 s rate whenever enable conditions are met	A
					AND			
					status byte in substate PRESSUREBUILDUP	= RUNNING		
					Reductant Defrost check (please see the definition)	= TRUE -		
					ambient pressure	> 0.00 kPa		
					ambient temperature	> -30.04 °C		
					number of pressure build-up attempts in pressure buildup and ventilation states	>= 20 counts		
					Dwell time in Pressure Build up substate	>= 10.00 sec		
					Dwell time in ventilation substate	>= 0.23 sec		
					Urea heater release reason	≠ COMPONENT PROTECTION -		
					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	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	-	0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	
			where				status of SCR control state (please see the definition)	=	No Pressure control	-		
			(a) Reductant tank temperature	=	measured parameter	-	Engine off Time	>	28800.00	sec		
			(b) fuel temperature	=	measured parameter	-	time since start	>	6.00	sec		
							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	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							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	>	28800.00	sec		
			(a) Reductant tank temperature	=	measured parameter	-	time since start	>	6.00	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	-		
							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 Tank Temperature Sensor Circuit Low	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	<	0x001	hex	basic enable conditions met:	=	see sheet enable tables	-	fault exists for more than 3 sec; 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	>	0x3FE 1022	hex dec	basic enable conditions met:	=	see sheet enable tables	-	fault exists for more than 6 sec; monitor runs at 1 s whenever enable conditions are met	B
			Corresponds to a temperature of	>=	160.0	°C	and					
			Corresponds to a resistance of	<=	0.153	kOhm	No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	TRUE	-		
			Corresponds to a voltage of	<=	0.270	V						
			Raw value of the CAN message for the Reductant Tank Temperature	=	0x3FF 1023	hex dec						
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)	<	100.00	miles	Engine Running	=	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	>=	60.00	sec		
			and with (b) change in mileage	=	measured parameter	-	and diagnosis tester	=	FALSE	-		
			and (c) - (d)	<	4.00	l	and fuel transfer pump active	=	FALSE	-		
			with (c) maximum volume of fuel reached in secondary tank during driving cycle	=	measured parameter	-	means (					
			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) minimum volume of fuel reached in secondary tank during driving cycle	=	measured parameter	-	filtered fuel volume in primary tank	>	1638.35	l		
			and				or					
			filtered fuel volume in secondary tank	>	0.00	l	filtered fuel volume in secondary tank	<	0.00	l		
							for					
							time	>	0.00	sec		
							and					
							cumulative transfer pump on time in current ignition cycle	>	0.00	sec		
							)					
							and					
							fuel level zone 1					
							means					
							(					
							filtered fuel volume in primary tank	>=	137.40	l		
							and					
							filtered fuel volume in secondary tank	>=	0.00	l		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables			
SRC low for fuel level sensor of secondary tank	P2067	Detects low voltage readings in the fuel level secondary tank sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 2	<	0.20	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.2 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
SRC high for fuel level sensor of secondary tank	P2068	Detects high voltage readings in the fuel level secondary tank sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 2	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.2 ms 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.
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 5 times 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	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor		3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 1	>	-60.04	°C		
			(c) heat capacity	=	1050.00	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	=	1.00	factor	change in exhaust-gas temperature sensor 1	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 1	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=255	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 1	=	100.00	°C	for					
							time	>=	50.00	sec		
							and					
							change in modeled exhaust-gas temperature sensor 1	>	4.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 1	>	10.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 1	<	12.00	kJ		
							further defined that heat quantity is integrated and monitor makes a decision at between the above calibration heat quantity range and integrator is reset (diagnostic multiple times per cycle)					
							)					
							and					
							engine has been in normal mode for time	>=	1.00	sec		
							or					
							engine has been in exhaust warm-up mode for time	>=	1.00	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	-		
							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 5 times 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	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 2	>	-60.04	°C		
			(c) heat capacity	=	1050.00	J/Kg/°C	and					
			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	=	1.00	factor	change in exhaust-gas temperature sensor 2	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 2	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 2	=	100.00	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 2	>	4.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 2	>	10.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 2	<	12.00	kJ		
							further defined that heat quantity is integrated and monitor makes a decision at between the above calibration heat quantity range and integrator is reset (diagnostic evaluates multiple times per cycle)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					) and engine has been in normal mode for time	>= 1.00 sec		
					or engine has been in exhaust warm-up mode for time	>= 1.00 sec		
					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 5 times monitor runs with 0.1 s rate whenever enable conditions are met	B
			or integrated heat quantity of exhaust gas temperature sensor 3	> (a) / (b) * (c) / (d) * (e) * (g) -	for time	> 1500.00 sec		
			with (a) exhaust gas mass flow	= calculated parameter -	and time since start	> 327.00 sec		
			and with (b) factor	= 3.60 g/sec	and (exhaust-gas temperature sensor 3	> -60.04 °C		
			and with (c) heat capacity	= 1050.00 J/Kg/°C	and			
			and with (d) factor	= 1000 kW/°C	exhaust-gas temperature sensor 3)	< 1999.96 °C		
			and with (e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 3	= 1.00 factor	and change in exhaust-gas temperature sensor 3	< 7.00 °C		
					for time	= 5.00 sec		
			and with (f) minimum permissible temperature deviation for exhaust gas temperature sensor 3	= -100.00 °C	and			
			and with		engine operation point suitable for diagnostic (see Look-Up-Table #29)	= 0 to 255 -		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	= 100.00 °C	for			
					time	>= 0.05 sec		
					and change in modeled exhaust-gas temperature sensor 3	> 4.00 °C		
					and (heat quantity for exhaust gas temperature sensor 3	> 10.00 kJ		
					and heat quantity for exhaust gas temperature sensor 3	< 12.00 kJ		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							further defined that heat quantity is integrated and monitor makes a decision at between the above calibration heat quantity range and integrator is reset (diagnostic multiple times per cycle)					
							)					
							and					
							engine has been in normal mode for time	>=	1.00	sec		
							or					
							engine has been in exhaust warm-up mode for time	>=	1.00	sec		
							and					
							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 5 times 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	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 4	>	-60.04	°C		
			(c) heat capacity	=	1050.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 4	<	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 3	=	1.00	factor	change in exhaust-gas temperature sensor 4	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 3	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	=	100.00	°C	for					
							time	>=	0.05	sec		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					change in modeled exhaust-gas temperature sensor 4	>	4.00	°C		
					and					
					(					
					heat quantity for exhaust gas temperature sensor 4	>	10.00	kJ		
					and					
					heat quantity for exhaust gas temperature sensor 4 further defined that heat quantity is integrated and monitor makes a decision at between the above calibration heat quantity range and integrator is reset (diagnostic multiple times per cycle)	<	12.00	kJ		
					)					
					and					
					engine has been in normal mode for time	>=	1.00	sec		
					or					
					engine has been in exhaust warm-up mode for time	>=	1.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump Control Circuit	P208A	Diagnoses the Reductant Pump Motor low side driver circuit for circuit faults.	Voltage low during driver off state (indicates Open circuit)	= Open Circuit:≥ 200 K Ω impedance between signal and controller ground -	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 6.2 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	>	1.00	sec		
					and					
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					battery voltage	<	655.34	V		
					for time	>	3.00	sec		
					and					
					(					
					battery voltage correction factor (please see the parameter definition	>	0.00	factor		
					and					
					battery voltage correction factor (please see the parameter definition	<	4.00	factor		
					)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>	3.00	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.				ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 0.01 s monitor runs with 0.01 sec rate whenever enable conditions are met	
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and (battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and battery voltage correction factor (please see the parameter definition)	<	4.00	factor		
							for time	>	3.00	sec		
							and 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	>	4.00	sec	(				fault exists for more than 0.3 s; monitor runs at 0.1 s whenever enable conditions are met	A
			timer for functional acknowledgement of the reductant pump motor	<=	6.00	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	-		
							((					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Remaining defrosting time of the tank	> 0 sec		
					Remaining defrosting time of the tank	<= 120.00 sec		
					)			
					OR			
					Reductant Defrost check (please see the definition)	= TRUE -		
					))			
					)			
					(			
					ambient temperature	> -30.04 °C		
					)			
					basic enable conditions met:	= see sheet enable tables -		
Reductant Pump Control Circuit High Voltage	P208D	Diagnoses the Reductant Pump Motor low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	ECU Initialization task in progress	= FALSE -	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	> 1.00 sec		
					and			
					battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and			
					battery voltage	< 655.34 V		
					for time	> 3.00 sec		
					and			
					(			
					battery voltage correction factor (please see the parameter definition	> 0.00 factor		
					and			
					battery voltage correction factor (please see the parameter definition	< 4.00 factor		
					)			
					for time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Reductant Purge Valve Control Circuit	P20A0	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	ECU Initialization task in progress	= FALSE -	fail conditions exists for 3 s monitor runs with 10 msec	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for				rate whenever enable conditions are met	
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Purge Valve Performance	P20A1	This diagnostic checks the Reductant Purge valve performance during operation by detecting a lack of reduction of the reductant pressure	Difference between reductant pump pressure at beginning and end of pressure reduction state	<	50.00	kPa	(				fault exists for more than 1 event monitor runs with 100 ms rate whenever enable conditions are met	A
							Reductant Dosing System state pressure reduction	=	TRUE	-		
							Reductant Dosing System pump relative pressure to initiate test	>=	350.00	kPa		
							)					
							AND					
							((					
							Time attempting to reduce dosing pressure	>=	5.00	sec		
							AND					
							Reductant Dosing System pump relative pressure after attempting to reduce pressure	>	50.00	kPa		
							)					
							OR					
							Reductant Dosing System pump relative pressure after attempting to reduce pressure	<=	50.00	kPa		
							)					
							(					
							ambient pressure	>	0.00	kPa		
							ambient temperature	>	-100.04	°C		
							)					

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 Purge Valve Control Circuit Low Voltage	P20A2	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	ECU Initialization task in progress	= FALSE -	fail conditions exists for 2 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	> 1.00 sec		
					and battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and battery voltage	< 655.34 V		
					for time	> 3.00 sec		
					and (battery voltage correction factor (please see the parameter definition	> 0.00 factor		
					and battery voltage correction factor (please see the parameter definition)	< 4.00 factor		
					for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Reductant Purge Valve Control Circuit High Voltage	P20A3	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	ECU Initialization task in progress	= FALSE -	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	> 1.00 sec		
					and battery voltage	> 11.00 V		
					for time	> 3.00 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	>	3.00	sec		
					and					
					(					
					battery voltage correction factor (please see the parameter definition	>	0.00	factor		
					and					
					battery voltage correction factor (please see the parameter definition	<	4.00	factor		
					)					
					for					
					time	>	3.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Aftertreatment Fuel Injector Control Circuit	P20CB	Electronic output 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 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for					
					time	>	1.00	sec		
					battery voltage	>	11.00	V		
					for					
					time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for					
					time	>	3.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					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	<	50.00	°C		
			particulate filter downstream temperature - SCR downstream temperature	> 300 °C	for time	>	10.00	sec		
					)					
					AND					
					(					
					time since last successful regeneration	>	900.00	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	>	300.00	sec		
					)					
					AND					
					(					
					time since the end of the last tip cleaning request of the Exhaust Aftertreatment Fuel Injector HCI tip cleaning is performed to prevent the nozzle of the HCI from sticking shut or building deposits that may effect its flow. During tip cleaning, the injector is operating at a higher injection frequency (100 Hz) with 30% duty cycle for a duration less than two seconds. HCI tip cleaning is requested at 30%, 50% and 75% of soot loading level on the DPF when the following conditions are also met:	>	300.00	sec		
					HCI Injector is not currently activated	=	TRUE	-		
					SCR Catalyst downstream temperature	<	499.96	°C		
					SCR Catalyst downstream temperature	>	179.96	°C		
					DOC Upstream Temperature	>	219.96	°C		
					Engine Speed	>	500	rpm		
					Vehicle Speed	>	3.10	mph		
					Exhaust Mass Flow	>	72.00	g/sec		
					)					
					AND					
					basic enable conditions met:	=	see sheet enable tables	-		
					AND					
					NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		
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 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for time	>	1.00	sec		
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for time	>	3.00	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 -		
					and			
					Diesel dosing valve: fuel injection	= INACTIVE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	P20CE	Diagnoses the Exhaust Aftertreatment Fuel Injector low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	engine pre drive	= FALSE -	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for			
					time	> 1.00 sec		
					battery voltage	> 11.00 V		
					for			
					time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for			
					time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
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	>= 28800.00 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 #30)	> 100 to 999 °C	and			
			with		ambient temperature	> -60.04 °C		
			(a) captured oxidation catalyst downstream temperature at start and with	= measured parameter -	and			
					Engine Running (see parameter definition)	= TRUE -		
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	= measured parameter -	for			
			or		time	> 0.00 sec		
			Path 2:		and			
			(		engine post drive/ afterun	= FALSE -		
			|(a) - (b)| (see Look-Up-Table #30)	<= 100 to 999 °C	and			
			with		diagnostic performed in current dc	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) captured oxidation catalyst downstream temperature at start and with	=	measured parameter	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		
			(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 #31) with	>	30 to 999	°C						
			(a) captured oxidation catalyst downstream temperature at start and with	=	measured parameter	-						
			(b) captured oxidation catalyst upstream temperature at start as reference temperature and	=	measured parameter	-						
			status of block heater	=	FALSE	-						
Reductant Pressure Too Low	P20E8	Compare Reductant tank pressure with lower thresholds under metering control	Reductant Pump Module Pressure	<	400.00	kPa					fail conditions exists for more than 60.0 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							status of SCR control sub state (please see the definition)	=	Metering control	-		
							status byte in substate METERING CONTROL	=	Running			
							Dwell time in Metering control substate	>	1.00	sec		
							ambient pressure	>	0.00	kPa		
							ambient temperature	>	-30.04	°C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant System Performance Bank 1	P20E9	**Path 1:**									fail conditions exists for more than 10 s monitor runs with 0.1 s rate whenever enable conditions	A
		Compare Reductant tank pressure with upper threshold under metering control	Reductant Pump Module Pressure	>	650.00	kPa	status of SCR control sub state (please see the definition)	=	Metering control	-		
							status byte in substate METERING CONTROL	=	Running	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Dwell time in Metering control substate	>	1.00	sec	conditions are met	
							ambient pressure	>=	0.00	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	>=	795.00	kPa	ambient pressure	>	0.00	kPa	fail conditions exists for more than 1 s monitor runs with 0.1 s rate whenever enable conditions	
							ambient temperature	>	-30.04	°C		
							basic enable conditions met:	=	see sheet enable tables	-		
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)	<	0.00	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	>	300.00	sec		
			(a) measured SCR catalyst efficiency	=	calculated parameter	factor						
			(b) offset-corrected modeled SCR catalyst efficiency: (b) = ((c) * (d) * (e)) + (f)	=	calculated parameter	factor	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
			where				for time	>	60.00	sec		
			(c) SCR modeled NOx conversion efficiency		calculated parameter	factor	Status of NOx signal of downstream NOx sensor (please see the definition)	=	TRUE	-		
			(d) correction map dependent on SCR catalyst temperature and upstream NOx mass flow		1.00	factor	for time	>	60.00	sec		
			(e) correction map dependent on SCR catalyst temperature and exhaust mass flow		1.00	factor						
			(f) Offset threshold (see Look-Up-Table #100)		-0.3 to -0.1	factor	(					
							Release of dosing strategy (please see the definition)	=	TRUE	-		
							for time	>=	(a) + (b)	sec		
							(a) Turn on delay time 1 of status metering strategy		330.00	sec		
							(b) Turn on delay time 2 of status metering strategy		20.00	sec		
							)					
							(					
							Status for disabling SCR Efficiency monitoring following an SCR Adaptation completion (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	>	(a) + (b)	sec		
					(a) Debounce time after pre controlled dosing over	>	0.50	sec		
					(b) delay time the status of disabling SCR Efficiency monitoring	>	80.00	sec		
					or					
					integrated upstream NOx	>=	3276.70	g		
					)					
					(					
					Status of pre controlled dosing (please see the definition)	=	FALSE	-		
					for time	>	(a) + (b)			
					(a) Debounce time after pre controlled dosing off	=	0.50	sec		
					(b) Delay time after pre controlled dosing off	=	300.00	sec		
					or					
					integrated upstream NOx	>=	3276.70	g		
					)					
					(					
					Decrease of Reductant load level (please see the definition)	=	FALSE	-		
					for time	>	300.00	sec		
					)					
					(					
					Average slow filtered NOx mass flow upstream SCR	<=	0.20	g/sec		
					for time	>	0.50	sec		
					Monitor disable time based on average NOx mass flow and the time (see Look-Up-Table #88)	>	0 to 120	sec		
					)					
					for time with	>	5.00	sec		
					((					
					Delta SCR temperature (see Look-Up-Table #85)	<	59.96 to 64.96	°C		
					Delta SCR temperature (see Look-Up-Table #101)	>	-50.04 to -0.04	°C		
					Delta SCR temperature	<=	524.96	°C		
					Delta SCR temperature	>=	199.96	°C		
					Initialization time of temperature gradient calculation	>=	2.50	sec		
					)					
					or					
					Delta SCR temperature	<	229.96	°C		
					or					
					Delta SCR temperature	>	499.96	°C		
					for time	>	10.00	sec		
					)					
					(					
					normalized HC load in SCR catalyst	>	21.00	-		
					)					
					(					
					ambient pressure	>=	74.80	kPa		
					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.
					)					
					(					
					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	>=	20.00	g		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					for time	>	600.00	sec		
					)					
					SCR NOx Catalyst Efficiency Below Threshold Bank 1 was performed this drive cycle	=	FALSE	-		
					(					
					engine speed	>=	1000.00	rpm		
					engine speed	<=	3000.00	rpm		
					for time	>	0.00	sec		
					)					
					SCR estimated current Reductant load (see Look-Up-Table #77)	>=	0.05 to 0.75	g		
					SCR estimated current Reductant load (see Look-Up-Table #76)	<=	2 to 2.2	g		
					Difference between nominal and estimated Reductant (see Look-Up-Table #79)	>=	-0.5 to -0.1	g		
					Difference between nominal and estimated Reductant (see Look-Up-Table #78)	<=	0.15 to 0.25	g		
					SCR in Pre-Control State (please see the definition)	=	FALSE	-		
					(					
					Disable after SCR adaptation	=	FALSE	-		
					for time	>	600.00	sec		
					)					
					((					
					(a) - (b)	<=	74.96	°C		
					for time	>	0.00	sec		
					)					
					or					
					(					
					(a) - (b)	>=	14.96	°C		
					for time	>	0.00	sec		
					(a) upstream SCR catalyst temperature					
					(b) downstream SCR catalyst temperature					
					))					
					Integrated NOx mass upstream SCR	>	1.00	g		
					for time	>	0.00	sec		
					Average SCR Temperature	<=	399.96	°C		
					Average SCR Temperature	>=	-3549.94	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Downstream SCR catalyst temperature	>=	3003.56	°C		
					Downstream SCR catalyst temperature	<=	-3549.94	°C		
					Filtered and delayed upstream NOx raw emission	>=	750.00	ppm		
					Filtered and delayed upstream NOx raw emission	<=	175.00	ppm		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	<=	0.17	g/sec		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	>=	0.01	g/sec		
					Filtered exhaust gas mass flow	<=	236.13	g/sec		
					Filtered exhaust gas mass flow	>=	-910.30	g/sec		
					MAP for valid engine operation points for SCR efficiency monitoring (see Look-Up-Table #83)	=	0 to 1	-		
					for time	>	0.00	sec		
					Inverse calculated accelerator pedal value	>	5.00	%		
					for time	>	0.00	sec		
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.35	factor		
					number of SCR efficiency measurements for fast initialization mode	>=	3.00	count		
					EWMA Rapid Response mode:					
					EWMA filtered delta SCR catalyst efficiency	>	0.12	factor		
					(a) - (b) (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	<	-0.01	factor		
					offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	>	0.00	factor		
					filter coefficient for Rapid Respond mode	=	0.16	factor		
					number of SCR efficiency measurements for Rapid Response mode	>=	6.00	count		
					EWMA filtered value too small in Fast Init. And Rapid Response modes:					
					EWMA filtered delta SCR catalyst efficiency of (a) - (b) (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	<	0.00	factor		
					EWMA stabilized mode:					
					filter coefficient for stabilized mode	=	0.04	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.
							not disabled during following conditions	=	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	<=	0.79	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 acceleration pedal position	<=	-6.6	%	and 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 acceleration pedal position	>=	125.6	%	and 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 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	<=	0.31	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 acceleration pedal position	<=	-13.9	%	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.
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	>=	2.32	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 acceleration pedal position	>=	115.1	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and 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 the voltages on each of the pedal position sensors.	|maximum value ((a/b) or (c)) - maximum value ((c) or (d))| (see Look-Up-Table #13)	>	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 (a) voltage of acceleration pedal position sensor 1	=	measured parameter	V	and basic enable conditions met:	=	see sheet enable tables	-		
			and with (b) factor between sensor raw values	=	2.00	factor	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and with (c) minimum voltage	=	450.00	V						
			and with (d) redundant voltage of acceleration pedal (from pedal position sensor 2)	=	calculated parameter	-						

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 1	P2146	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #1.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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	-		
Injector Positive Voltage Control Circuit Group 2	P2149	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #2.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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 3	P2152	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #3.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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 4	P2155	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #4.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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	-		
Reductant tank heater short circuit	P214F	Compare the maximum measured conductance of a tank heater against the threshold	maximum conductance of tank heater	>=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions	B
					with		urea tank heater powerstage on	=	TRUE	-		
			(a) upper threshold	=	0.98	1/Ohm	battery voltage	>=	11.00	V		
			(b) factor for tolerances	=	1.00	factor	battery voltage	<=	100.00	V		
							engine off time	>=	5400.00	sec		
							urea tank temperature	<=	41.96	°C		
							(					
							conductance of the urea tank heater is steady or falling	=	TRUE	-		
							maximum counter	>	1000.00	count		
							or					
							heater activation time	>=	600.00	sec		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

<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 Temp Sensor 1 / 2 Correlation</td><td>P2199</td><td>Detects biased Humidity Temperature Sensor (IAT #1) or MAF Intake Air Temperature Sensor (IAT #2) by comparing the measured temperatures at start.</td><td>Path 1:</td><td></td><td></td><td></td><td>minimum engine-off time</td><td>>=</td><td>28800.00</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 #2)</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>where</td><td></td><td></td><td></td><td>ambient air temperature</td><td>></td><td>-60.04</td><td>°C</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</td><td></td><td></td><td></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 humidity temperature 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></td><td></td><td></td><td></td><td></td><td></td><td></td><td>time</td><td>></td><td>0.00</td><td>sec</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>or</td><td></td><td></td><td></td><td>and</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>Path 2:</td><td></td><td></td><td></td><td>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>(</td><td></td><td></td><td></td><td>and</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>|(a) - (b)| (see Look-Up-Table #2)</td><td><=</td><td>100 to 999</td><td>°C</td><td>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>where</td><td></td><td></td><td></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>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</td><td></td><td></td><td></td><td>and</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>(b) captured humidity temperature at start</td><td>=</td><td>measured parameter</td><td>-</td><td>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</td><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>|(a) - (b)| (see Look-Up-Table #5)</td><td>></td><td>20 to 999</td><td>°C</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>where</td><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>(a) captured intake air temperature at start</td><td>=</td><td>measured parameter</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>and</td><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>(b) captured humidity temperature at start</td><td>=</td><td>measured parameter</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>and</td><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></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>status of block heater (see parameter definition)</td><td>=</td><td>FALSE</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>or</td><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>status of sun-load detection (see parameter definition)</td><td>=</td><td>FALSE</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></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></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Reductant Level Sensor 2 Circuit Low</td><td>P21AA</td><td>CAN message: Discrete level sensor level 2 short to ground error</td><td>Reductant Tank Level 2 Error Status</td><td>=</td><td>1</td><td>-</td><td>ignition on</td><td>=</td><td>TRUE</td><td>-</td><td>fail conditions exists for more than 3 sec
monitor runs with 1 s rate whenever enable conditions are met</td><td>A</td></tr>
<tr><td></td><td></td><td></td><td>(tank level sensor 2 voltage directly measured after a test impulse was applied)</td><td><</td><td>(0.17)</td><td>V</td><td>battery voltage</td><td>></td><td>8</td><td>V</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>basic enable conditions met:</td><td>=</td><td>see sheet enable tables</td><td>-</td><td></td><td></td></tr>
<tr><td>Reductant Level Sensor 2 Circuit High</td><td>P21AB</td><td>Path 1:</td><td></td><td></td><td></td><td></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.
		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	-		
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	-	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions are met	A
			(tank level sensor 3 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 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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant tank heater open circuit	P21DD	Compare the maximum measured conductance of a tank heater against the threshold	maximum conductance of tank heater	<=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions are met	B
					with		urea tank heater powerstage on	=	TRUE	-		
			(a) lower threshold	=	0.92	1/Ohm	battery voltage	>=	11.00	V		
			(b) factor for tolerances	=	1.00	factor	battery voltage	<=	100.00	V		
							engine off time	>=	5400.00	sec		
							urea tank temperature	<=	41.96	°C		
							(					
							conductance of the urea tank heater is steady or falling	=	TRUE	-		
							maximum counter	>	1000.00	count		
							or					
							heater activation time	>=	600.00	sec		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit 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	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions	A
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	94.96	°C		
							SCR upstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	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		
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Detects a failure when open circuit status message from binary lambda signal from the NOx sensor is received continuously for a time period	Open circuit binary lambda signal error	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever	
							battery voltage	>=	11.00	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.
					SCR upstream temperature	>= 94.96 °C	enable conditions are met	
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when open circuit status message from linear lambda signal from the NOx sensor is received continuously for a time period	Open circuit linear lambda signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when short circuit status message from NOx sensor is received continuously for a time period	Short Circuit Nox signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							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		
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Detects a failure when short circuit status message from binary lambda signal form the NOx sensor is received continuously for a time period	Short Circuit binary lambda signal error	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	94.96	°C		
							SCR upstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	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		
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Detects a failure when short circuit status message from linear lambda signal from the NOx sensor is received continuously for a time period	Short Circuit linear lambda signal error	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	94.96	°C		
							SCR upstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
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)	> 2500.00 ppm	Nox sensor 1 ready status (see parameter definition)	= TRUE -	fault exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	B
					Valid NOx signal from CAN is received (no Nox sensor communication failures)	= TRUE -		
					Engine Running (see parameter definition)	= TRUE -		
					for time	> 20.00 sec		
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)	< -90.00 ppm	and			
					Injection Quantity	> 8.00 mm^3/rev		
					or			
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					for time	> 600.00 sec		
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	Open Circuit Nox Heater signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Upstream NOx sensor dewpoint achieved (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.
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when short circuit status message from NOx sensor heater is received continuously for a time period	Short Circuit Nox heater signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
NOx Heater Performance Bank 1 Sensor 1	P2209	Monitoring of the upstream NOx sensor signal readiness	Upstream NOx sensor heater temperature has reached setpoint	= FALSE -	(		fault exists for more than 1 event when dewpoint end is reached; monitor runs at 0.02 s when enable conditions are met	B
					battery voltage	>= 11.00 V		
					and			
					battery voltage	<= 655.34 V		
					and			
					Oxidation Catalyst upstream temperature	>= 94.96 °C		
					and			
					Oxidation Catalyst upstream temperature	<= 3003.56 °C		
					and			
					Engine running	= TRUE -		
					for time	> 20.00 sec		
					and			
					Upstream NOx sensor dewpoint end is reached (please see parameter definition)	= TRUE -		
					)			
					for time	> 150.5 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	-		
							No Pending or Confirmed DTC	=	see sheet inhibit tables	-		
Reductant pressure line heater open circuit	P221C	Compare the measured conductance of a pressure line heater against the threshold	conductance of pressure line heater	>=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 5 s monitor runs with 3 s rate whenever enable conditions are met	B
					with		and					
			(a) upper threshold	=	0.92	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-		
			(b) factor for tolerances	=	1.00	factor	battery voltage	>=	11.00	V		
							battery voltage	<=	100.00	V		
							engine off time	>=	0.00	sec		
							heater activation time	>=	81.00	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant pressure line heater short circuit	P221D	Compare the measured conductance of a pressure line heater against the threshold	conductance of pressure line heater	<=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 5 s monitor runs with 3 s rate whenever enable conditions are met	B
					with		and					
			(a) lower threshold	=	0.12	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-		
			(b) factor for tolerances	=	1.00	factor	battery voltage	>=	11.00	V		
							battery voltage	<=	100.00	V		
							engine off time	>=	0.00	sec		
							heater activation time	>=	81.00	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Urea supply module heater open circuit	P221E	Detects a supply module heater open circuit by detecting low conductance in the heater	a <= b	=	TRUE	-	ignition switch on	=	TRUE	-	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum conductance of the supply module heater	=	calculated parameter	1/Ohm	supply module heater powerstage on	=	TRUE	-		
			and with				and					
			(b) minimum tolerance threshold of the conductance for the supply module heater	=	0.14	1/Ohm	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	100.00	V		
							and					
							engine off time	>=	7600.00	sec		
							and					
							and					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					conductance of the urea tank heater is steady or falling			
					for			
					time	> 100.00 sec		
					or			
					heater activation time	>= 10.00 sec		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Urea supply module heater short circuit	P221F	Detects a supply module heater short circuit by detecting high conductance in the heater	a >= b	= TRUE -	ignition switch on	= TRUE -	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	B
			with		and			
			(a) maximum conductance of the supply module heater	= calculated parameter 1/Ohm	supply module heater powerstage on	= TRUE -		
			and with		and			
			(b) maximum tolerance threshold of the conductance for the supply module heater	= 0.35 1/Ohm	battery voltage	>= 11.00 V		
					and			
					battery voltage	<= 100.00 V		
					and			
					engine off time	>= 7600.00 sec		
					and			
					and			
					(			
					conductance of the urea tank heater is steady or falling			
					for			
					time	> 100.00 sec		
					or			
					heater activation time	>= 10.00 sec		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Barometric Pressure Sensor "A" 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	<= 1.97 V	ignition on	= TRUE -	fail conditions exists for 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
			same as		and			
			ambient pressure	<= 50.00 kPa	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.
Barometric Pressure Sensor "A" 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	>	4.54	V	ignition on	=	TRUE	-	fail conditions exists for 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
			same as ambient pressure	>=	115.00	kPa	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Turbo Boost System Performance	P2263	Detects if the Turbocharger is severely over or under boosting based on control deviation	**Path 1**				(				fail conditions exists for 15 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			control deviation of the boost pressure calculated out of difference between desired and actual value with	>	(g*h)		VNT turbocharger offset adaptation active - 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	=	FALSE	-		
			(g) the upper limit (see Look-Up-Table #64)	=	42.5 to 45.0	kPa	and					
			(h) correction factor (see Look-Up-Table #59)	=	0.900024 to 1	factor	VNT turbocharger 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					
							injection quantity is stable means	=	TRUE	-		
							increase of injection quantity	<	80.00	(mm^3/rev) /sec		
							and					
							engine speed is stable means	=	TRUE	-		
							increase of engine speed	<	100.00	rpm/sec		
							and					
							injection Quantity	>=	80.00	mm^3/rev		
							injection Quantity	<=	480.00	mm^3/rev		
							and					
							engine Speed	>=	1200.00	rpm		
							engine Speed	<=	3400.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							working range of boost pressure is in closed-loop	=	TRUE	-		
							means					
							(					
							engine speed	>	1200.00	rpm		
							and					
							injection quantity	>	20.00	mm^3/rev		
							)					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
							for time	>	2.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables			
			Path 2				(				fail conditions exists for 15 s monitor runs with 0.01 s rate whenever enable conditions are met	
			control deviation of the boost pressure calculated out of difference between desired and actual value with	<	(i*j)	-	VNT turbocharger offset adaptation active - 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	=	FALSE	-		
			(i) the upper limit (see Look-Up-Table #63)	=	-80 to -40	kPa	and					
			(j) correction factor	=	1.00	factor	VNT turbocharger 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					
							injection quantity is stable	=	TRUE	-		
							means					
							increase of injection quantity	<	80.00	(mm^3/rev) /sec		
							and					
							engine speed is stable	=	TRUE	-		
							means					
							increase of engine speed	<	100.00	rpm/sec		
							and					
							injection Quantity	>=	80.00	mm^3/rev		
							injection Quantity	<=	480.00	mm^3/rev		
							and					
							engine Speed	>=	1200.00	rpm		
							engine Speed	<=	3400.00	rpm		
							and					
							working range of boost pressure is in closed-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.
					(					
					engine speed	>	1200.00	rpm		
					and					
					injection quantity	>	20.00	mm^3/rev		
					)					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					for time	>	2.00	sec		
					and					
					Basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pressure Regulator 2 Control Circuit	P2294	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground -	battery voltage	>	11.00	V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for time	>	3.00	sec		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					and					
					ignition on	=	TRUE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
		Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for driver over temperature faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded		battery voltage	>	11.00	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
					for time	>	3.00	sec		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					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.
Fuel Pressure Regulator 2 Control Circuit Low Voltage	P2295	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	battery voltage	>	11.00	V	fail conditions exists for 0.75 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pressure Regulator 2 Control Circuit High Voltage	P2296	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Circuit Bank 1 Sensor 2	P229E	Detects a failure when open circuit status message from downstream NOx sensor is received continuously for a time period	Open circuit downstream NOx signal error	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							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		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		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	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	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		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							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	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	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.
					Downstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Downstream NOx sensor short circuit error via the CAN message	Short circuit NOx signal error of downstream NOx sensor via CAN message	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR downstream temperature	>= 94.96 °C		
					SCR downstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Downstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					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 -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR downstream temperature	>= 94.96 °C		
					SCR downstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Downstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= 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.
		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	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	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		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	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)	>	2500.00	ppm	Downstream Nox sensor ready status (see parameter definition)	=	TRUE	-	fault exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	B
							Valid NOx signal from CAN is received (no Nox sensor communication failures)	=	TRUE	-		
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)	<	-90.00	ppm	Engine Running (see parameter definition)	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Injection Quantity	>	8.00	mm^3/rev		
							or					
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							for time	>	600.00	sec		
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	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	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	> 9.8 V		
					battery voltage	< 655.34 V		
					Downstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					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 -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR downstream temperature	>= 94.96 °C		
					SCR downstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 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		
					Downstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
NOx Heater Performance Bank 1 Sensor 2	P22A7	Compare the time difference between the time ECU requested to enable sensor and the time sensor responding for the request against the threshold	the time difference between the time ECU requested to enable sensor and the time sensor responding for the request	> 150.00 sec	(		fault exists for more than 1 event when dewpoint end is reached; monitor runs at 0.02 s when enable conditions are met	B
					battery voltage	>= 11.00 V		
					and			
					battery voltage	<= 655.34 V		
					and			
					SCR downstream temperature	>= 94.96 °C		
					and			
					SCR downstream temperature	<= 3003.56 °C		
					and			
					Engine running	= TRUE -		
					for time	> 20.00 sec		
					and			
					Downstream Nox Sensor Dewpoint end is reached (please see the parameter definition)	= TRUE -		
					)			
					for time	> 0.50 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	-		
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
N0x Sensor Performance Bank 1 Sensor 1	P22FA	Compare the measured NOx signal response time with the threshold when injection quantity changes from fueling to overrun	measured upstream NOx response time from 70% of the initial NOx value to 40% of the initial NOx value	>	2.30	sec	**global enable conditions:**				fail conditions exist for 1 event, test is performed in the 0.01 ms rate when enable conditions are met	B
			Or				upstream NOx readiness	=	TRUE	-		
			measured upstream NOx response time from the initial NOx value to 40% of the initial value.	>	5.00	sec	Engine operation mode ≠ DPF Regeneration	=	TRUE	-		
							no post injection	=	TRUE	-		
							No Pending or Confirmed DTC	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							state machine: inactive the following conditions moves the state machine from inactive state to steady-state operating point state: (					
							engine speed	>=	1200.00	rpm		
							injection quantity for combustion	>=	120.00	mm^3/rev		
							upstream NOx concentration	>=	100.00	ppm		
							)					
							state-machine: Check-Operating point the following conditions moves the state machine from steady-state operating point state to wait-for-overrun: (					
							engine speed	>=	1200.00	rpm		
							upstream NOx concentration	>=	100.00	ppm		
							injection quantity for combustion	<=	(a) + (b)	mm^3/rev		
							injection quantity for combustion	>=	(a) - (b)	mm^3/rev		
							with			mm^3/rev		
							(a) Reference injection quantity picked in Check-operating point state	=	measured parameter	mm^3/rev		
							(b) Maximum deviation of injection quantity	=	40.00	mm^3/rev		
							for time	>=	2.00	sec		
							)					
							state-machine: Wait-for-Overrun the following conditions moves the state machine from wait-for-overrun to evaluate-edge state: (					
							injection quantity for combustion	<	(a) - (b)	mm^3/rev		
							with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) Reference injection quantity picked in Check-operating point state	=	measured parameter	mm^3/rev		
							(b) Maximum deviation of injection quantity	=	40.00	mm^3/rev		
							)					
							state-machine: evaluate-edge the following conditions moves the state machine from evaluate-edge state to overrun state: (					
							injection quantity for combustion	<	2.00	mm^3/rev		
							time since the last state	<	1.05	sec		
							)					
Downstream NOx sensor Self diagnostic Bank 1 Sensor 2	P22FE	NOx sensor self-diagnosis, which occurs within the NOx sensor and reported to the ECM , which runs in the ECM afterrun, and measures the sensor drift by comparing to a reference point.	average stored NOx sensor self-diagnostic result	>	143.99	%	**Global Release conditions:**				fault exists for more than 3 events; monitor runs at 0.1 s once per trip during the afterrun	B
			Or				time interval between the runs of the diagnostic tests	>	10.00	sec		
			average stored NOx sensor self-diagnostic result	<	62.00	%	status of downstream NOx sensor validity	=	True	-		
							SCR downstream temperature	>=	-7.04	°C		
							SCR downstream temperature	<=	399.96	°C		
							status of current engine operation system ≠ Post Drive	=	TRUE	-		
							Engine operation mode = normal mode	=	TRUE	-		
							engine speed	<=	1500.00	rpm		
							engine speed	>=	0.00	rpm		
							for time		5.00	sec		
							Modeled downstream NOx concentration	<	160.00	ppm		
							Battery voltage	<=	6553.40	V		
							Battery voltage	>=	10.00	V		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							status of heater temperature validity for downstream Nox sensor	=	TRUE	-		
							(					
							engine speed	<	1200.00	rpm		
							virtual pedal angle	<	10.00	%		
							for time	<=	14400.00	sec		
							With					
							(((					
							SCR downstream temperature	<=	129.96	°C		
							for time	>=	40.00	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	>=	600.00	sec		
					)					
					((					
					vehicle speed	<=	31.08	mph		
					for time	>=	40.00	sec		
					)					
					for time	>=	600.00	sec		
					))					
					(					
					Status: DFP Regeneration active	=	FALSE	-		
					Or					
					Status: DPF Regeneration not completed	=	FALSE	-		
					)					
					Rising edge of the following conditions:	=	TRUE	-		
					(					
					Ignition key on	=	TRUE	-		
					Engine operation status	=	Running	-		
					)					
					with					
					(					
					Status: DPF Regeneration not completed	=	TRUE	-		
					Status: DFP Regeneration active	=	TRUE	-		
					Engine coolant temperature	<=	59.96	°C		
					))					
					(					
					Ignition key on	=	TRUE	-		
					Or					
					status of over run condition	=	TRUE	-		
					for time	<=	12.00	sec		
					status of over run condition	=	FALSE	-		
					for time	>	20.00	sec		
					)					
					(					
					Estimated HC Load in SCR catalyst	<=	2.00	g		
					Or					
					(					
					change of estimated HC Load in SCR catalyst	>=	(a) * (b)	g		
					within time	<	0.20	sec		
					(a) Estimated HC Load limit in SCR catalyst		-0.01	g/sec		
					(b) time factor		0.20	sec		
					))					
					And					
					(					
					Estimated HC Load in SCR catalyst	>=	32.00	g		
					engine speed	<=	4000.00	rpm		
					engine speed	>=	500.00	rpm		
					SCR downstream temperature	<=	199.96	°C		
					SCR downstream 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.
							SCR downstream temperature	<=	199.96	°C		
							for time	>=	1.00	sec		
							)					
							for time (see Look-Up-Table #99)	>=	100 to 900	sec		
							)					
							((					
							vehicle speed	<=	44.75	mph		
							for time	>=	1.00	sec		
							)					
							for time (see Look-Up-Table #99)	>=	100 to 900	sec		
							))					
							Additional release conditions:					
							vehicle speed	=	0	mph		
							number of possible test runs in after-run	<	20.00	counts		
							Engine operation status = Post Drive	=	True	-		
							for time	>=	100.00	sec		
							for time in ECM afterrun	>=	30.00	sec		
							for time in ECM afterrun	<=	300.00	sec		
							status of heater temperature validity for downstream Nox sensor	=	True	-		
							number of tests for averaging test result	<=	1.00	count		
							Status of downstream NOx sensor self diagnosis (Bit2)	=	4	decimal		
							for time	>=	1	sec		
							Afterrun Conditions:					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							Engine operation status = Post Drive	=	True	-		
							vehicle speed	=	0			
							measured downstream NOx concentration	<=	160.00	ppm		
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1500.00	rpm		
							NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
							maximum duration in afterrun	<=	300.00	sec		
							minimum duration to start self-diagnostic	<=	100.00	sec		
							number of self-diagnostic attempts	<	20.00	count		
							basic enable conditions met:	=	see sheet enable tables	-		
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				basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for 6 s test performed continuously 0.1 s rate	A
							and					
			(a) oxidation catalyst upstream temperature	>	799.96	°C	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and with									
			(b) oxidation catalyst downstream temperature	>	799.96	°C						
			and with									
			(c) SCR downstream temperature	>	799.96	°C						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and with (d) particulate filter downstream temperature	>	799.96	°C						
Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P242C	Detects low voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR low condition	voltage of SCR downstream catalyst temperature sensor	<	0.65	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 Downstream SCR Catalyst temperature	<	-50	°C	engine speed	<=	6000.00	rpm		
							engine speed	>=	0.00	rpm		
							current injection quantity	<=	800.00	mm^3/rev		
							current injection quantity	>=	0.00	mm^3/rev		
							engine coolant temperature	>	-50.04	°C		
							time since engine start	>	0.00	sec		
							exhaust-gas mass flow downstream of the exhaust manifold	>	0.00	g/sec		
							)					
							or					
							SCR catalyst temperature	>	-45.04	°C		
							)					
							for time	>	0.00	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	Detects high voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR high condition	voltage of SCR downstream 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 Downstream SCR Catalyst temperature	>	1000	°C	engine speed	<=	6000.00	rpm		
							engine speed	>=	0.00	rpm		
							current injection quantity	<=	800.00	mm^3/rev		
							current injection quantity	>=	0.00	mm^3/rev		
							engine coolant temperature	>	-50.04	°C		
							time since engine start	>	0.00	sec		
							exhaust-gas mass flow downstream of the exhaust manifold	>	0.00	g/sec		
							)					
							or					
							SCR catalyst temperature	>	-45.04	°C		
							)					
							for time	>	0.00	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.
Diesel Particulate Filter Differential Pressure Sensor Performance	P2453	Detects in range faults on the DPF differential pressures sensor.	change in differential pressure	<	-1.00	kPa/s	(				fail conditions exists for 3 s test performed continuously 0.1 s rate	B
			or				change in exhaust gas volume flow	>	375.00	m^3/h/s		
			change in differential pressure	>	1.00	kPa/s	or					
							change in exhaust gas volume flow	<	-375.00	m^3/h/s		
							)					
							and					
							current exhaust gas volume flow	>	375.00	m^3/h		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							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	>	3.20	kPa	for time	>	35.00	sec		
			or				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 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	<	0.83	V	ignition on	=	TRUE	-	fail conditions exists for 3 s test performed continuously 0.020 s rate	B
			same as				and					
			differential pressure	<	-4.20	kPa	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	>	4.67	V	ignition on	=	TRUE	-	fail conditions exists for 3 s test performed continuously 0.020 s rate	
			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.
			differential pressure	>	91.70	kPa	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation (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	<	0.45	-	following conditions for time	>=	120.00	sec	fail conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	B
							(					
							engine speed	>=	1400.00	rpm		
							and					
							engine speed	<=	2800.00	rpm		
							)					
							and					
							(					
							injection quantity	>=	20.00	mm^3/rev		
							and					
							injection quantity	<=	320.00	mm^3/rev		
							)					
							and					
							(					
							recirculated exhaust-gas mass flow downstream of the EGR cooler	>=	12.50	g/sec		
							and					
							recirculated exhaust-gas mass flow downstream of the EGR cooler	<=	32.72	g/sec		
							)					
							and					
							EGR controller is active	=	TRUE	-		
							and					
							(					
							(a) - (b) with (a) filtered temperature upstream of EGR-cooler and with (b) engine temperature	>=	210.00	°C		
							)					
							and					
							(					
							(a) - (b) with (a) filtered temperature upstream of EGR-cooler and with (b) engine temperature	<=	3276.70	°C		
							)					
							and					
							engine coolant temperature	>=	69.96	°C		
							and					
							engine coolant temperature	<=	129.96	°C		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(					
							actual valve position of exhaust-gas recirculation	>=	9.9976	%		
							and					
							actual valve position of exhaust-gas recirculation	<=	5.00	%		
							)					
							and					
							(					
							control value provided for EGR cooling bypass	>=	-400.00	%		
							and					
							control value provided for EGR cooling bypass	<=	5.00	%		
							for					
							time	>	10.00	sec		
							)					
							and					
							ambient pressure	>=	74.80	kPa		
							and					
							(					
							ambient temperature	>=	-7.04	°C		
							and					
							ambient temperature	<=	3003.56	°C		
							)					
							and					
							DPF regeneration not active	=	TRUE	-		
							and					
							diagnostic performed in current Drive Cycle	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							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 (measured used for determining DPF regeneration trigger)	>	((a) - (b)) + ((c) * (d))	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 (function of vehicle speed only)	=	measured parameter	-	last particulate filter regeneration successful	=	TRUE	-		
			and with				or					
			(b) soot mass at the end of previous DPF regeneration	=	calculated parameter	-	particulate filter regeneration must have been completed	=	TRUE	-		
			and with				and					
			(c) factor for calculation of a soot mass value offset depending on the simulated maximal base soot mass (see Look-Up-Table #65)	=	0 to 549	g	basic enable conditions met:	=	see sheet enable tables	-		
			and with				and					
			(d) factor for determination of correction factor for ash in the particulate filter	=	1.00	factor	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) Cooler Bypass Valve Control Circuit	P245A	Diagnoses the EGR Cooler Bypass low side driver circuit for circuit faults. 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.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	battery voltage	>	11.00	V	fail conditions exists for 7s (in engine postdrive/ afterun duration limited to 5s) monitor runs with 0.01s rate whenever enable conditions are met	B
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for time	>	3.00	sec		
					and					
					EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
					for time	>	3.00	sec		
					and					
					(					
					open load diagnostics is triggered after offset learning of valve is completed					
					or					
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					)					
					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	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for time	>	3.00	sec		
					and					
					EGR Cooling Bypass 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.
					(			
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	P245C	Diagnoses the EGR Cooler Bypass low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage	> 11.00 V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					EGR Cooling Bypass Solenoid Control Circuit	= ACTIVE -		
					and			
					(			
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	P245D	Diagnoses the EGR Cooler Bypass low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	battery voltage	> 11.00 V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					EGR Cooling Bypass 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.
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							)					
							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	>	69.60	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	<	0.65	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as particulate filter downstream temperature	<	-60	°C	and basic enable condions met:	=	see sheet enable tables	-		
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	>	2.21	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as particulate filter downstream temperature	>	999.6	°C	and basic enable condions 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 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 controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value	<	-10.00	%	and offset learning of EGR cooling bypass valve actuator active	=	FALSE	-		
							and offset learning in the previous driving cycle was complete	=	TRUE	-		
							and engine speed	>	100.00	rpm		
							and EGR Cooler Bypass Valve Actuator	=	ACTIVE	-		
							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 cooling bypass position circuit	raw 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 EGR cooling bypass actuator position	<	-22.5	%	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 High Voltage	P2495	Detects high voltage readings on the EGR cooling bypass position circuit, indicating an OOR high condition on the EGR cooling bypass position circuit	raw voltage of EGR cooling bypass actuator position sensor	>	4.80	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 EGR cooling bypass actuator position	>	114	%	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	-		
Closed loop Reductant Injection Control at Limit-Flow too high	P249D	Detects an out of range high of the long term Reductant quantity adaption factor	long term adaptation factor of Reductant quantity	>	1.40	factor	long term adaption 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 Reductant Injection Control at Limit-Flow too low	P249E	Detects an out of range low of the long term Reductant quantity adaption factor	long term adaptation factor of Reductant quantity	<	0.41	factor	long term adaption triggered	=	TRUE	-	fail conditions exists for more than 5 sec. monitor runs with 0.01 s rate 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	>=	0.00	-	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 HCI control loop	>	maximum of (a) and (b+c)		time	>	30.00	sec		
			with				and					
			(a) temperature threshold value	=	100.00	°C	(					
			and with				exhaust gas temperature control is active	=	TRUE	-		
			(b) temperature value for threshold of monitoring	=	0.00	°C	means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and with				(					
			(c) basic temperature threshold value for monitoring	=	100.00	°C	temperature upstream of the oxidation catalyst	>	224.96	°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	>=	14.92	mph		
							and					
							vehicle speed	<=	124.30	mph		
							and					
							Actual time spent in coastdown mode	<	60.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							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 #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 HCI control loop	<	minimum of (a) and (b+c-(d-e))		time	>	30.00	sec		
			with				and					
			(a)	=	-75.00	°C	(					
			and with									
			(b) temperature value for threshold of monitoring	=	0.00	°C	exhaust gas temperature control is active	=	TRUE	-		
			with				means					
			(c) basic temperature threshold value for monitoring	=	100.00	°C	(					
			and with				temperature upstream of the oxidation catalyst	>	224.96	°C		
			(d) temperature setpoint for exhaust gas system control loop	=	calculated parameter	-	and					
			and with				(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(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	>=	14.92	mph		
							and					
							vehicle speed	<=	124.30	mph		
							)					
							and					
							Actual time spent in coastdown mode	<	60.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
EGR Cooling Bypass Performance	P24C4	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:**				(				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	>	50.00	%	(					
			or									
			Path 2:									
			learned offset value for EGR cooler bypass valve in the present driving cycle	>	16.00	%	active cleaning mode of EGR cooler bypass valve - no movement in EGR cooling bypass valve	=	FALSE	-		
			or				and					
			learned offset value for EGR cooler bypass valve in the present driving cycle	<	-16.00	%	engine post drive/ afterun	=	TRUE	-		
			or				and					
			Path 3:				(					
			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	%	battery voltage	>=	10.00	V		
			or				and					
			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	%	battery voltage	<=	30.00	V		
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							(					
							engine coolant temperature	>=	5.06	°C		
							and					
							engine coolant temperature	<=	130.06	°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	-		
		Detects a jammed EGR cooling bypass valve during opening or closing the valve.	**Path 1:**				EGR cooler bypass valve is opening	=	TRUE	-	fail conditions exists for 5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			EGR cooler bypass valve stuck during opening	=	TRUE	-	or					
			which means				EGR cooler bypass valve is closing	=	TRUE	-		
			(				and					
			(a) + (b)	>=	75.01	%	(					
			with				(					
			(a) position of the EGR cooling bypass valve				active cleaning mode of EGR cooler bypass valve - no movement in EGR cooling bypass valve	=	FALSE	-		
			and with				and					
			(b) learned offset value of EGR cooler bypass valve in the previous driving cycle	=	calculated parameter	-	engine post drive/ afterun	=	TRUE	-		
			and				and					
			(a) - (b)	>=	0.99	%	(					
			with				battery voltage	>=	10.00	V		
			(a) position of the EGR cooling bypass valve			-	and					
			and with				battery voltage	<=	30.00	V		
			(b) position of the EGR cooling bypass valve of the previous process cycle	=	calculated parameter	-	)					
			)				and					
			for time	>	5.00	sec	(					
							engine coolant temperature	>=	5.06	°C		
			or				and					
			Path 2:				engine coolant temperature	<=	130.06	°C		
			EGR cooler bypass valve stuck during closing	=	TRUE	-	)					
			which means				)					
			(				or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			position of the EGR cooling bypass valve	<	(a) * (b)	-	offset learning active	=	TRUE	-		
			with				or					
			(a) reference position of the EGR cooling bypass valve in open position	=	calculated parameter	-	diagnosis tester present	=	FALSE	-		
			and with				)					
			(b) calibrateable factor of the EGR cooling bypass valve close position	=	0.15	factor	and					
			and				completion of offset learning	=	TRUE	-		
			(a) - (b)	<=	0.02	%	and					
			with				basic enable conditions met:	=	see sheet enable tables	-		
			(a) position of the EGR cooling bypass valve				and					
			and with				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			(b) position of the EGR cooling bypass valve of the previous process cycle	=	calculated parameter	-						
			)									
			for time	>	5.00	sec						
ECM Power Relay Circuit Performance	P2510	Detection of Main Relay that has opened without a request from ECU	Number of detected occurrences of main relay opening without ECM request (stored in EEPROM)	>	1.00	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	B
							and					
							engine pre drive	=	TRUE	-		
							and					
							Basic enable conditions met:	=	see sheet enable conditions	-		
		Detection of main relay that is stuck and not opened when commanded by ECM	Time after request to open the main relay	>	1.40	sec	ignition on	=	FALSE	-	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with 0.02 s rate whenever enable conditions	B
							and					
							engine pre drive	=	FALSE	-		
							and					
							Basic enable conditions met:	=	see sheet enable conditions	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Torque Management Request Input Signal "A"	P2544	Detects implausible torque request information received from the TCM	**Path 1:**				ignition on	=	TRUE	-	fail conditions exist for 0.005 s	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			number of messages with rolling count / protection value errors detected	>=	7.00	-	and				test performed continuously 0.005 s rate	
			with				basic enable conditions met:	=	see sheet enable tables	-		
			number of consecutive frames	=	15.00	-	and					
			or				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			Path 2:									
			internal calculated checksum value for transmission is not equal the received value	=	TRUE	-						
			and									
			number of fault results	>	15.00	-						
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	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			same as				and					
			boost pressure position	>	93,5	%	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							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	<	150.00	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			same as				and					
			boost pressure position	<	4,6	%	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	>=	300.00	rpm	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable	B
							and					
							adaption not active	=	FALSE	-		
							and					

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 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	%	offset learned since last clearing of fault code memory	=	TRUE	-	conditions are met	
							and					
							engine running	=	TRUE	-		
							for					
							time (see Look-Up-Table #92)	>	30 to 327.67	sec		
							and					
							(					
							engine coolant temperature	>=	69.96	°C		
							and					
							engine coolant temperature	<	129.96	°C		
							)					
							and					
							(					
							environmental temperature	>=	-15.04	°C		
							and					
							environmental temperature	<	199.86	°C		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Unmetered Fuel - Forced Engine Shutdown	P25BD	Detects engine overspeed in the event that there is an error in the ECM or engine damage has occurred which is resulting in the engine speed increasing beyond desired control limits. Upon failure detection, the engine will be shutdown by closing the diesel intake air valve and disabling the fuel injectors	current engine speed	>	4900.00	rpm	ignition on	=	TRUE	-	fail conditions exists for .01 s test performed continuously	A
							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.
Control Module Power Off Timer Performance	P262B	Detects a failure in the engine off timer if during the after run the internal SW timer and the EOT do not correlate. A failure is detected when the respective timers are started after a calibration time then both are stopped, if the difference between the calculated times exceeds a calibrated threshold a fault is set.	**Path 1:**				time since engine post drive/ afterun	<	20.00	sec	fail conditions exists for 0.01 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	B
			acquired engine off time	<	(100% - ((a) - 7.5%))	-	and					
			or **Path 2:**				engine post drive/ afterun and	=	TRUE	-		
			acquired engine off time	>	(100% + ((a) - 7.5%))	-	basic enable conditions met:	=	see sheet enable tables	-		
			(where (a) Tolerance threshold for diagnosis of stop counter	=	17.19	%						
		Detects Communication failure with on-board control unit (PCA8565) after the HW reset of PCA8565 was performed	Communication failure with on-board control unit (PCA8565)	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for1 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	-		
		Detects an interrupted supply voltage of the engine off time circuit (permanent battery voltage supply line to ECM)	permanent supply voltage is interrupted via open circuit	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 1 event monitor runs once per driving cycle with 0.01 s rate	
							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.
											whenever enable conditions are met	
Fuel Transfer Pump Relay Control Circuit	P2632	Electronic out-put driver circuitry determines that the tank transfer pump circuit is open.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	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.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	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 High	P2634	Electronic out-put driver circuitry determines that the tank transfer pump circuit is shorted to battery.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	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 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 327 s monitor runs 0.02 s rate whenever enable conditions are met	B
			change in fuel volume in primary tank	< 0.80 l	Engine Running	= TRUE -		
			and		and			
			change in fuel volume in secondary tank	< 0.00 l	fuel transfer pump active	= TRUE		
			or		means			
			Path 2:		(			
			change in fuel volume in primary tank	< 0.80 l	(			
			and		filtered fuel volume in primary tank	< 1638.30 l		
			change in fuel volume in secondary tank	>= 0.00 l	or			
			or		filtered fuel volume in secondary tank	> 0.00 l		
			Path 3:		and			
			change in fuel volume in primary tank	>= 0.80 l	time between activations of transfer pump	> 32767.00 sec		
			and		and			
			change in fuel volume in secondary tank	< 0.00 l	fuel level zone 5			
					means			
					(			
					filtered fuel volume in primary tank	< 137.40 l		
					and			
					filtered fuel volume in secondary tank	> 0.00 l		
					)			
					)			
					vehicle speed	<= 0.00 mph		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					)			
					for			
					time	> 327.67 sec		
					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			
					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.
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 1 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 2 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 3 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 4 are valid and	= TRUE	fail conditions exist for 1 s test performed	A

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: and NO Pending or Confirmed DTCs:	see sheet enable tables see sheet inhibit tables	continuously with 1 s rate	
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 5 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 6 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 7 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
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 ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 8 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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 4WD-Lo active based on transmission turbine speed, output shaft speed, and gear ratio	=	TRUE	-	and 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	r	100.00	%		
							and accelerator pedal position	>	10.00	%		
							and engine speed	<	6000.00	rpm		
							and engine speed	>	1000.00	rpm		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit 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)	<	0.00	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	>	300.00	sec		
			(a) measured SCR catalyst efficiency	=	calculated parameter	factor						
			(b) offset-corrected modeled SCR catalyst efficiency : (b) = ((c) * (d) * (e)) + (f)	=	calculated parameter	factor	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
							for time	>	60.00	sec		
			where				Status of NOx signal of downstream NOx sensor (please see the definition)	=	True	-		
			(c) SCR modeled NOx conversion efficiency	=	calculated parameter	factor	for time	>	60.00	sec		
			(d) correction map dependent on SCR catalyst temperature and upstream NOx mass flow	=	1.00	factor						
			(e) correction map dependent on SCR catalyst temperature and exhaust mass flow	=	1.00	factor	(					
			(f) Offset threshold (see Look-Up-Table #102)	=	0.1 to 0.125	factor	Release of dosing strategy (please see the definition)	=	TRUE	-		
							for time	>=	(a) + (b)	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					(a) Turn on delay time 1 of status metering strategy		330.00	sec		
					(b) Turn on delay time 2 of status metering strategy		20.00	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	>	0.50	sec		
					(b) delay time the status of disabling SCR Efficiency monitoring	>	80.00	sec		
					or					
					integrated upstream NOx	>=	3276.70	g		
					)					
					(					
					Status of pre controlled dosing (please see the definition)	=	FALSE	-		
					for time	>	(a) + (b)			
					(a) Debounce time after pre controlled dosing off	=	0.50	sec		
					(b) Delay time after pre controlled dosing off	=	300.00	sec		
					or					
					integrated upstream NOx	>=	3276.70	g		
					)					
					(					
					Decrease of Reductant load level (please see the definition)	=	FALSE	-		
					for time	>	300.00	sec		
					)					
					(					
					Average slow filtered NOx mass flow upstream SCR	<=	0.20	g/sec		
					for time	>	0.50	sec		
					Monitor disable time based on average NOx mass flow and the time (see Look-Up-Table #88)	>	0 to 120	sec		
					)					
					for time with	>	5.00	sec		
					((					
					Delta SCR temperature (see Look-Up-Table #85)	<	59.96 to 64.96	°C		
					Delta SCR temperature (see Look-Up-Table #101)	>	-50.04 to -0.04	°C		
					Delta SCR temperature	<=	524.96	°C		
					Delta SCR temperature	>=	199.96	°C		
					Initialization time of temperature gradient calculation	>=	2.50	sec		
					)					
					or					
					Delta SCR temperature	<	229.96	°C		
					or					
					Delta SCR temperature	>	499.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time		10.00	sec		
					)					
					(					
					normalized HC load in SCR catalyst	>	21.00	factor		
					)					
					(					
					ambient pressure	>=	74.80	kPa		
					ambient temperature	>=	-7.04	°C		
					)					
					(					
					Stuck reductant dosing valve fault was healed	=	FALSE	-		
					last particulate filter regeneration successful	=	TRUE	-		
					)					
					(					
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					for time	>	600.00	sec		
					)					
					Reductant Delivery performance completed this drive cycle	=	FALSE	-		
					(					
					engine speed	>=	1000.00	rpm		
					engine speed	<=	3000.00	rpm		
					for time	>	0.00	sec		
					)					
					SCR estimated current Reductant load (see Look-Up-Table #77)	>=	0.05 to 0.75	g		
					SCR estimated current Reductant load (see Look-Up-Table #76)	<=	2 to 2.2	g		
					Difference between nominal and estimated Reductant (see Look-Up-Table #79)	>=	-0.5 to -0.1	g		
					Difference between nominal and estimated Reductant (see Look-Up-Table #78)	<=	0.15 to 0.25	g		
					SCR in Pre-Control State (please see the definition)	=	FALSE	-		
					(					
					Disable after SCR adaptation	=	FALSE	-		
					for time	>	600.00	sec		
					)					
					((					
					(a) - (b)	<=	74.96	°C		
					for time	>	0.00	sec		
					)					
					or					
					(					
					(a) - (b)	>=	14.96	°C		
					for time	>	0.00	sec		
					(a) upstream SCR catalyst temperature					
					(b) downstream SCR catalyst temperature					
					))					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Integrated NOx mass upstream SCR	>	1.00	g		
					for time	>	0.00	sec		
					Average SCR Temperature	<=	399.96	°C		
					Average SCR Temperature	>=	-3549.94	°C		
					Downstream SCR catalyst temperature	<=	3003.56	°C		
					Downstream SCR catalyst temperature	>=	241.96	°C		
					Filtered and delayed upstream NOx raw emission	<=	750.00	ppm		
					Filtered and delayed upstream NOx raw emission	>=	175.00	ppm		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	<=	0.17	g/sec		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	>=	0.01	g/sec		
					Filtered exhaust gas mass flow	<=	236.13	g/sec		
					Filtered exhaust gas mass flow	>=	-910.29	g/sec		
					MAP for valid engine operation points for SCR efficiency monitoring (see Look-Up-Table #84)	=	0 to 1	factor		
					for time	>	0.00	sec		
					Inverse calculated accelerator pedal value	>	5.00	%		
					for time	>	0.00	sec		
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.35	factor		
					number of SCR efficiency measurements for fast initialization mode	>=	2.00	count		
					EWMA Rapid Response mode:					
					EWMA filtered delta SCR catalyst efficiency	>	0.12	factor		
					(a) - (b) (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	<	-0.01	factor		
					offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	>	0.00	factor		
					filter coefficient for Rapid Respond mode	=	0.08	factor		
					number of SCR efficiency measurements for Rapid Response mode	>=	6.00	count		
					EWMA filtered value too small in Fast Init. And Rapid Respond modes: EWMA filtered delta SCR catalyst efficiency of (a) - (b) (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	<	0.00	factor		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EWMA stabilized mode: filter coefficient for stabilized mode number of SCR efficiency measurements for stabilized mode basic enable conditions met:	 = 0.04 factor = 1 count = see sheet enable 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
Lost Communications with Transmission Control Module	U0101	Detects loss of communication between ECM (on-board control unit) and TCM (transmission control module)	time since last message from transmission control module was received	> 0.18 sec	ignition on for time and battery voltage and battery voltage and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - >= 3.00 sec >= 9.00 V <= 6553.40 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 10 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.
Glow Plug Diagnostic Status Frame	U0106	Monitoring of the reception of glow plug control frame	Frame timeout error is detected when frame is not received within the timeout count	>	5.00	counts	ignition on	=	TRUE	-	test performed continuously at 0.02 s rate whenever enable conditions are met	B
							and Bus off or error passive on CAN	=	FALSE	-		
							and Frame enabled. The EMC is authorized to read the frame	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Lost Communication with Reductant Control Module	U010E	CAN frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	40.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 5 sec monitor runs with 0.1 s rate	A
							Can Bus Initialized (CAN Bus is Active)					
							consisting of: ignition	=	TRUE	-		
							for time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	DLS1 Sliding Window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs with 1 s rate	
		Check of level sensor	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of: ignition	=	TRUE	-		
							for time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	DLS2 Sliding Window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs with 1 s rate	
		Check of temperature sensor	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of: ignition	=	TRUE	-		
							for time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	DLS3 Sliding Window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs with 1 s rate	
		Check of error states	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							ignition for time battery voltage battery voltage	= > < >	TRUE 5.00 6553.40 9.00	- sec V V		
Lost Communications with Auxiliary Heater Control Module	U0166	Detects loss of communication between ECM (on-board control unit) and Auxiliary Heater Control Module	time since last message from auxiliary heater control module was received	>	2.50	sec	ignition on for time and battery voltage and battery voltage and basic enable conditions met: and NO Pending or Confirmed DTCs:	= >= >= <= = =	TRUE 3.00 9.00 6553.40 see sheet enable tables see sheet inhibit tables	- sec V V - -	fail conditions exists for 12 s test performed continuously 0.01 s rate	Special C
Engine Out NOx Sensor CAN Message #1	U029D	Engine out NOx sensor CAN message #1 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	= = > < >	TRUE TRUE 5.00 6553.40 9.00	- - sec V V	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	A
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx cor	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	 = > < >	 TRUE 5.00 6553.40 9.00	 - sec V V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx ser	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active) consisting of: ignition for	 =	 TRUE	 -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Engine Out NOx Sensor CAN Message #2		Engine out NOx sensor CAN message #2 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx ser	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Engine Out NOx Sensor CAN Message #3		Engine out NOx sensor CAN message #3 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx ser	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		

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	-		
Engine Out NOx Sensor CAN Message #4		Engine out NOx sensor CAN message #4 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.02 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx ser	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Engine Out NOx Sensor CAN Message #5		Engine out NOx sensor CAN message #5 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.1 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
Post Catalyst NOx Sensor CAN Message #1	U029E	Post catalyst NOx sensor CAN message #1 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.005 s rate	A
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx c	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Post Catalyst NOx Sensor CAN Message #2		Post catalyst NOx sensor CAN message #2 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.005 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							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.
Post Catalyst NOx Sensor CAN Message #3		Post catalyst NOx sensor CAN message #3 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.005 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	10.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Post Catalyst NOx Sensor CAN Message #4		Post catalyst NOx sensor CAN message #4 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.02 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	6553.40	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Post Catalyst NOx Sensor CAN Message #5		Post catalyst NOx sensor CAN message #5 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Can Bus Initialized (CAN Bus is Active)				21 sec monitor runs with 0.1 s rate	
					consisting of:					
					ignition	=	TRUE	-		
					for					
					time	>	5.00	sec		
					battery voltage	<	6553.40	V		
					battery voltage	>	9.00	V		

End of Table

15 OBDG12 ECM Diagnostic Parameter Definition Table

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	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 which influences system behavior)	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
			and			
			(a) - (b)	>	4.5	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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)			
		Engine Running (see Look-Up table #70)	ignition	=	ON	-
			engine speed	>=	100	rpm
			engine speed was at start	>	850	rpm
		Engine Post-Drive/ Afterun also includes "engine stopping" during engine spin down	processor operating normally	=	TRUE	-
			ignition	=	OFF	-
			key off bookkeeping cleanup	=	in process	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
Engine Operating Modes	Exhaust Operating Mode focus	Normal Mode				
		Particulate Filter Regeneration Mode				
		Particulate Filter Regen Service Mode				
		Exhaust Gas Temperature (Active) Management Mode also known as Engine Operating Mode		= =	Warm Up or Maintain Temperature Exhaust Warm-up	-
Exhaust Gas Recirculation (EGR)		Exhaust Gas Recirculation (EGR) Control is enabled	EGR controller is active continuously with exceptions 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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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 or sync via crank only invoked then crankshaft rotations	 >=	 4	 counts
Fuel System		Fuel System is in Fuel Shut Off also known as Decel Fuel Shut Off or Over-Run	engine running required actual engine torque -	= < -	TRUE 1 -	- Nm -
		Status of Diesel Fuel Refill Detection	((Filtered total fuel volume available (a) Amount of fuel volume change that indicates a refueling event occurred (b) captured remaining diesel fuel volume under the following conditions (Vehicle speed time) and (Vehicle speed time)) or at initialization of Diesel fuel level	 > = = <= > <= > =	 (a) + (b) 25.26 measured parameter 1.24 4 1.24 30 TRUE	 - % - mph sec mph sec -
Idle Speed Control		Idle Speed Controller Active "normal" low idle speed governor	no overrides for: Gear-Shift Harmonization Intrusive Diagnosis Action			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			Power Take Off or other working load handling			
		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	-
			))			
		Upstream Nox Sensor Signal Ready or Upstream Nox SensorDewpoint Reached or Lambda signal from NOx sensor ready	following condition met for time:	>	30	sec
			(			
			Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			)			
		Status of NOx signal of downstream NOx sensor				

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			(			
			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	-
			for time	>	0.5	sec
			engine speed	>	100	rpm
			for time	>	20	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Upstream Nox Sensor Signal Ready or Upstream Nox SensorDewpoint Reached or Lambda signal from NOx sensor ready	following condition met for time:	>	30	sec
			(			
			Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
		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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Enabling Downstream NOx sensor heater diagnosis	(			
			SCR Catalyst upstream temperature	>=	94.96	°C
			SCR Catalyst upstream temperature	<=	3003.56	°C
			battery voltage	>=	11	V
			battery voltage	<=	655.34	V
			and			
			Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	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	-
		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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			(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	-
			)			
		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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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 parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
			(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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			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	-
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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 parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
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	-
	NOx Control System Reductant Dosing Pressure Control System States		ignition	=	on	-
		State of Reductant Pressure Control System: Standby	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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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	-
		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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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	-
		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	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
	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	-
			(			
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec
			ambient temperature	>	-4.04	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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	-
		State of the defrosting check of supply module	**State of the defrosting check of supply module (please see the definition)**			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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	-
			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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			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
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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
			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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
		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			
			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			
			((			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	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
			))			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		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
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	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	=	FALSE	-
			(please see the definition)			
			)			
			and			
			(			
			status of reductant tank heater temperature	=	TRUE	-
			(please see the definition)			
			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	=	FALSE	-
			(please see the definition)			
			)			
			and			
			(			
			status of reductant tank heater temperature	=	TRUE	-
			(please see the definition)			
			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)	(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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
			(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
			)))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
		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	-
			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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			NO Pending or Confirmed DTCs:	=	TRUE	-
			or			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
		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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release))	=	1617	g
		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 15OBDG12-HD	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			
			(			
			Previous warning level	>	49	-
			vehicle speed	<=	98.75	mph

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			))			
			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
			))			
			and with			
			Reductant Quality state	=	0	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
		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	-
		Warning_Level5: 48 decimal, Warning level 5	((			
			Reductant tank level	<	Full	-
			Remaining mileage	<=	628.75	miles
			and with			
			(			
			Warning level	<=	49	Warning level

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			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	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
		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	-
	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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			)			
			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			
			(			
			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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
		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 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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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
			Upstream Nox mass flow difference : (a) - (b)	<=	500	mg/sec
			and with			
			(a) Filtered Upstream NOx mass flow			
			(b) Filtered actual upstream NOx mass flow			
			)			
			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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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
			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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			(			
			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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			(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
			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)	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			(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
			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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			(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	-
			)			
	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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
		continuation of previously started tank temperature performance monitoring cycle	temperature difference: (a) - (b)	<=	1.56	°C
			(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) and with (	=	Metering control	-
			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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 15OBDG12-HD	Defined by:	Enable Logic	Enable Values	Enable Units
			or			
			(			
			PM Filter Regeneration	=	active	
			Reluctant dosing valve modeled temperature	>	19.96	°C
			))			
			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.			

15 OBDG12 ECM Closed Loop Enable Condition Table

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
Exhaust Gas Recirculation (EGR)	Exhaust Gas Recirculation (EGR) Closed Loop Control is enabled	EGR controller is active continuously with exceptions for failures detected EGR controller is active Overrun Long Idle Transmission Gear Shift Cold Start extreme temperature or pressure Critical Regeneration Modes						
		Overrun	Engine Speed	>	1000	rpm	Crank Position	P0335,P0336, P0016
			Commanded Fuel	<	4	mm3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Overlong Idle	Engine Speed	<	1500	rpm	Crank Position	P0335,P0336, P0016
			Vehicle Speed	=	0	mph	Transmission output speed sensor	P0722, P0721
			Accelerator Pedal	=	0	%	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			Above conditions true for Time Function of EGR Temperature (see Look-Up-Table #22)	=	0 to 150	sec	EGR Gas Temperature 1	P040C, P040D, P040F
							Engine off timer	P02610
		System error	DTC Pending or Confirmed	=	P0101, P0102, P0103, P0400, P1118, P1117, P2205, P2263, P0403, P140F, P0490, P140E, P0489, P140D, P1407, P0406, P0405, P2229, P2228, P2453, P2263, P0106, P0108, P0107, P0098, P0097, P007D, P007C, P02E0, P02EB, P02E3, P122F, P02E2, P122E, P122C, P02E9, P02E8, P006F,P006E, P0045, P0048, P0047, P2565, P2564	-		
		Error exhaust gas recirculation valve	DTC Pending or Confirmed	=	P0406, P0405	-		
		Engine Brake Status	DFCO Active	=	TRUE	-		
			Vehicle Speed	>	12.42	mph	Transmission output speed sensor	P0722, P0721
		Atmospheric pressure too low	Barometric Pressure	<	72	kPa	Barometric Pressure	P2228, P2229, P0106
		Battery voltage too low	Battery Voltage	<	8	V		
		Switch-off coordinator	Not Used on our application will remove for future					
		Environmental temperature too low	Intake Air Temperature	<	-8	°C	Intake Air Temperature 2	P0097, P0098, P111C
		Environmental temperature too high	Intake Air Temperature	>	80	°C	Intake Air Temperature 2	P0097, P0098, P111C
		Engine temperature too low	Engine Coolant	<	44.5	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Engine temperature too high	Engine Coolant	>	108	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Cold start	Engine Cranking	=	Active	-	Crank Position	P0335,P0336, P0016
			or Engine Running	<	30	sec	Engine off timer	P02610
		Injection quantity too large	Commanded Fueling (see table 23) Function of Engine Speed & Charge Air Cooler Temp	<	220 to 400	mm^3/rev	Pedal Position 1 & 2 Crank Sensor Charge Air Cooler Temperature Out	P2122, P2123, P2138, P2127, P2128 P0335,P0336, P0016 P007D, P007C, P111C
		Environmental Temperature too low in Regeneration	Calibrated out on our application					
			Intake Air Temperature	<	-60	°C	Intake Air Temperature 2	P0097, P0098, P111C
		EGR Stroking	DFCO Active	=	TRUE	-	Engine off timer	P02610

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Exhaust Brake	=	Not Active			
		EGR controller is active in Overrun (warm exhaust system)	DFCO Active	=	TRUE	-		
			Regeneration Mode	=	Active			
		EGR controller is active in Overrun (Cold exhaust system)	DFCO Active	=	TRUE	-		
			Regeneration Mode	=	Active			
		Atmospheric Pressure too low in Regeneration	Calibrated out on our application					
			Barometric Pressure	<	52	kPa	Barometric Pressure	P2228, P2229, P0106
		Engine Temperature too low in Regeneration	Engine Coolant	<	50	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Engine Temperature too high in Regeneration	Engine Coolant	>	118	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
Fuel Balance Control States	Closed Loop	Command Fuel Quantity	injection quantity	≥	8	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			injection quantity (see Look-Up-Table #31)	≤	200 to 380	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	engine speed	≥	(Look-Up-Table #91) - 150	rpm	Crank Position	P0335,P0336, P0016
			engine speed	≤	2750	rpm	Crank Position	P0335,P0336, P0016
		No Active System Errors	No DTC Pending OR Active	=	P0335, P0336, P0340, P0341, P2146, P2149, P2152, P2155, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239	-		
	Open Loop	Command Fuel Quantity	injection quantity or	=	6	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			injection quantity	=	(Look-Up-Table #31) to (Look-Up-Table #31 + 20)	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	engine speed range 1	=	(Look-Up-Table #91)-250 to (Look-Up-Table #91) - 150	rpm	Crank Position	P0335,P0336, P0016
			engine speed range 2	=	2750 to 2850	rpm	Crank Position	P0335,P0336, P0016
		No Active System Errors	No DTC Pending OR Active	=	P0341, P0340, P0336, P0335, P2146, P2149, P2152, P2155, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239, P122A	-		
	InActive	Command Fuel Quantity	injection quantity Range 1 or	<	6	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			injection quantity Range 2	>	(Look-Up-Table #31) + 20	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	Engine Speed Range 1 or	<	(Look-Up-Table #91)-250	rpm	Crank Position	P0335,P0336, P0016
			Engine Speed Range 2	>	2850	rpm	Crank Position	P0335,P0336, P0016

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Active Errors	No DTC Pending OR Active	=	P0341, P0340, P0336, P0335, P2146, P2149, P2152, P2155, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239, P122A	-		
HCI Loop	Closed Loop	Regen demand	time distance fuel soot	≥ ≥ ≥ ≥	70,200 802 325 44	sec miles liters grams	 Delta Pressure Sensor	P2459, P2463 P2459, P2463 P2459, P2463 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature upstream DOC temperature for time	≤ ≥ ≥	620 230 0.5	C C s	EGT 1 EGT 1	P0545, P0546, P20E2, P2080, P2428 P0545, P0546, P20E2, P2080
		DPF inlet temperature	DPF upstream temperature DPF upstream temperature for time	≤ ≥ ≥	750 230 0.5	C C s	EGT 3 EGT 3	P242D, P242C, P242D, P113A, P242B, P2428 P242D, P242C, P242D, P113A, P242B
	Open Loop	Regen demand	time distance fuel soot	≥ ≥ ≥ ≥	70,200 802 325 44	s miles liters grams	 Delta Pressure Sensor	P2459, P2463 P2459, P2463 P2459, P2463 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature for time	<= \	230 0.5	C s	EGT 1	P0545, P0546, P20E2, P2080
		DPF inlet temperature	DPF upstream temperature or DPF upstream temperature for time	>= <= ≥	750 230 0.5	C C s	EGT 3 EGT 3	P242D, P242C, P242D, P113A, P242B, P2428 P242D, P242C, P242D, P113A, P242B
		No Active System Errors	No DTC Pending OR Active	=	P2084, P10CE, P10CD P20CE, P20CB, P20CD P10CC, P0420, P2463, P2033, P2032	-		
		Exhaust flow rate	exhaust flow rate	≥	13.89	g/sec	Mass Air Flow Sensor	P0101, P0102, P0103
Intake Manifold Pressure	Intake Manifold Pressure Control is enabled	Manifold Pressure controller is active continuously with exceptions for Pending & Confirmed DTCs & under following conditions						
		Manifold Pressure Closed Loop	Manifold pressure dependent on Engine Speed, Commanded Fueling, EGR, and BARO pressure (see Look-Up-Table 25 - 30)				Crank Position Pedal Position 1 & 2	P0335,P0336, P0016 P2122, P2123, P2138, P2127, P2128
		Working Range (Manifold Pressure Open Loop)		≠	Manifold Pressure Closed Loop			

15 OBDG12 ECM Closed Loop Enable Condition Table

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Cold Start	Engine Run time a function of Engine Coolant (see Look-Up-Table #24)	<	5 to 300	sec	Engine off timer	P02610
		System Error	No DTC Pending OR Active	=	P0102, P0103, P0118, P0117, P2263, P2229, P2228, P0107, P0108, P0C7D, P007C, P02E9, P02E8, P2565, P2564, P006F	-		
		Gear Shifting	Not Used in our Application Will Remove for Furture					
		Compressor Surge Detection	EGR Control	=	Not Active	-		
			Transmission Gear	=	R, 1, 2	-	Transmission Range Switch	P0706, P0708
			Engine Coolant	>	-20	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
				<	130	°C		
			Pressure Ratio (Manifold Pressure / Barometric Pressure)	>	1.85	ratio	Barometric Pressure	P2228, P2229, P0106
			Modelled Exhaust Gas Pressure / Manifold Pressure	>	0.65	ratio	Manifold Absolute Pressure Sensor	P0107, P0108, P0106
			Air Mass	<	333.33	g/sec	Mass Air Flow Sensor	P0102, P0103, P0101
			Engine Speed Gradient	<	500	rpm / sec	Crank Position	P0335,P0336, P0016
			Engine Torque Demand Gradient	<	-720	Nm / sec	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Exhaust Brake	DFCO Active	=	TRUE	-		
			Vehicle Speed	>	12.42	mph	Transmission output speed sensor	P0722, P0721
		Exhaust Pressure Control	Start Up Engine Coolant Temperature	<	80	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			Intake Air Temperature	<	4	°C	Intake Air Temperature 2	P0097, P0098, P111C
			Engine Coolant	<	66	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			PTO	=	Not Active			
			Transmission Gear State	=	P, N		Park Neutral Switch	P0851, P0852
			Brake Pressed	=	Not Active		Brake Pedal Position Sensor	P057D, P057C,
			Engine Speed	<	1300	rpm	Crank Position	P0335,P0336, P0016
			Vehicle Speed	<	15.53	mph	Transmission output speed sensor	P0722, P0721
			No DTC Pending OR Active	=	P0571, P0118, P0117, P0336, P0335, P2123, P2128, P2122, P2127, P007D, P007C			
Inner Loop - Reneration Temperature Control	Closed Loop	DPF Regeneration demand Active	time	≥	70,200	s		P2459, P2463
			distance	≥	802	miles		P2459, P2463
			fuel	≥	325	liters		P2459, P2463
			soot	≥	44	grams	Delta Pressure Sensor	P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature	≤	650	C	EGT 1	P0545, P0546, P20E2, P2080, P2428
			upstream DOC temperature	≥	100	C	EGT 1	P0545, P0546, P20E2, P2080
			for time	≥	0.5	s		
		No Active System Errors	No DTC Pending OR Active	=	P0420, P2463	-		
	Open Loop	DPF Regeneration demand Active	time	≥	70,200	s		P2459, P2463
			distance	≥	802	miles		P2459, P2463
			fuel	≥	325	liters		P2459, P2463
			soot	≥	44	grams	Delta Pressure Sensor	P2453, P2454, P2455

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		DOC inlet temperature	upstream DOC temperature	>=	650	C	EGT 1	P0545, P0546, P20E2, P2080, P2428
			upstream DOC temperature	<=	100	C	EGT 1	P0545, P0546, P20E2, P2080
			for time	≥	0.5	s		
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	-		
			Average temperature inside the SCR catalyst:	>	179.96	°C	Exh Temp Sensor 2 & 3	P2032, P2033, P20E2, P2084, P242C, P242D, P113A, P242B
			engine speed	>	400	rpm	Crank Position	P0335,P0336, P0016
			Status of request for Service Quality Test	=	0			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	NOx Control System Reductant Dosing Pressure Control System States		ignition	=	on	-		
		State of Reductant Pressure Control System: Standby	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	Crank Position	P0335,P0336, P0016
			Dwell time in the state of no pressure control	>=	2	sec		
			exhaust gas temperature Upstream SCR	>=	169.96	°C	Exh Temp Sensor 2	P2032, P2033, P20E2, P2084
			(					
			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	-		
		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	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			)					
			Set-point duty cycle for Reductant dosing valve	=	100	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	40.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		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	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			for time	>	0.5	sec		
			)					
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing valve	=	0%	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		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	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			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	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			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	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing valve	=	0	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			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	-	Reductant Pump Reverting Valve	P20A2, P1046, P20A3, P20A0, P20A1
			Set-point duty cycle for Reductant dosing valve	=	0	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	15.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			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	Crank Position	P0335,P0336, P0016
	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	-		
			(					
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			ambient temperature	>	-4.04	°C	Intake Air Temperature 2	P0097, P0098, P111C
			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	Intake Air Temperature 2	P0097, P0098, P111C
			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	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or					
			Engine off Time	<	2147483647	sec		
			Reductant tank heat temperature at Standby state	>	-9.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
		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	Crank Position	P0335,P0336, P0016
			(					
			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	-		
		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	Crank Position	P0335,P0336, P0016
			(					
			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	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			)					
			or					
			(					
			ignition	=	on	sec		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			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	Crank Position	P0335,P0336, P0016
			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					
			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					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			(					
			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:	=	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					
			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		
			))					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			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					
			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	-		
		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					
			((					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Waiting time before tank heater released started with	<	32767	sec		
			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		
			))					
			or					
			((					
			Waiting time before tank heater released started with	>	32767	sec		
			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 and with	>=	12	sec		
			(					
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec		
			ignition on	=	TRUE	-		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			time since engine started	<=	(a) * (b)			
			(a) Time period for a positive slope to detect refueling	=	12	sec		
			(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 and with	>=	8	sec		
			(					
			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) and with	=	TRUE	-		
			(					
			Frozen state is active during a certain warning level (please see the definition) and with	=	TRUE	-		
			(					
			Reductant tank Temperature	>=	-100.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or					
			Reductant low warning level (Please see the definition)	>=	0	level		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			)))					
		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	Intake Air Temperature 2	P0097, P0098, P111C
			((					
			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					
			(					
			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	Transmission output speed sensor	P0722, P0721
			)					
			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	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			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	-		
		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	Transmission output speed sensor	P0722, P0721
			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					
			(					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			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		
			))					
		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					
			(					
			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	Crank Position	P0335,P0336, P0016
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			)					
			or					
			(					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			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					
			(					
			Previous warning level	>	49	-		
			vehicle speed	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			))					
			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	Transmission output speed sensor	P0722, P0721
			))					
			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	Transmission output speed sensor	P0722, P0721
			))					
			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		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			)					
			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	Transmission output speed sensor	P0722, P0721
			))					
			and with					
			Reductant Quality state	=	0	-		
		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	Transmission output speed sensor	P0722, P0721
			)))					
			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					
			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			

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 15OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Warning_Level10: 112 decimal,Vehicle speed restriction aggressive	Warning level	=	112	Warning level		
			initialization phase after Reductant refill event is active and with	=	TRUE	-		
			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 and with	=	TRUE	-		
			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 and with	=	TRUE	-		
			Reductant Quality state	=	0	-		
	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 Tank Temperature Sensor	P205D, P205C, P205B
			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	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			)					
			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	Transmission output speed sensor	P0722, P0721
			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					
			(					
			status of SCR control sub state (please see the definition)	=	Pressure Build up	-		
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			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	-		
			)					

15 OBDG12 ECM Diagnostic Calibration Look-Up Tables

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	0

2	**P2199**	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

3	**P10CF**	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

4	**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

5	**P2199**	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

6	**P10CF**	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	27	27	27

7	**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

8	**P0401**	AirCtl_facEnvPresMinDvt_CUR

Ambient Pressure (kPa)	65	70	75	80	85	90	95	110
Correction Factor (-)	0.71	0.71	0.71	0.85	0.85	0.92	1	1

9	**P0401**	AirCtl_mEGRMinDvtLim_CUR

Ambient Pressure (kPa)	67	70	73	76	79	82	85	88	91	94	97	100
Air Mass Flow (g/rev)	0.8	0.8	0.8	0.8	0.85	0.9	0.95	1	1.05	1.1	1.15	1.2

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1000	1200	1300	1400	1500	2000	3000
20	0.6	0.5	0.5	0.4	0.4	0.4	0.6	0.6
40	0.6	0.5	0.5	0.4	0.4	0.4	0.6	0.6
60	0.6	0.5	0.5	0.4	0.4	0.4	0.6	0.6
80	0.6	0.5	0.5	0.4	0.4	0.4	0.6	0.6
100	0.6	0.5	0.5	0.4	0.4	0.4	0.6	0.6
120	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.6
160	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
200	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

11 **P0400** AirCtl_mMaxDvtPwr_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	500	1000	1500	2000	2500	3000	3750
0	2	2	2	2	2	2	2	2
20	2	2	2	2	2	2	2	2
40	2	2	2	2	2	2	2	2
60	2	2	2	2	2	2	2	2
80	2	2	1.8	1.8	1.8	1.8	2	2
160	2	2	1.8	1.6	1.6	1.6	2	2
320	2	2	1.8	1.6	1.6	1.6	2	2
380	2	2	2	2	2	2	2	2

12 **P0401** AirCtl_mMinDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1000	1400	1800	2200	2600	3000	3750
0	-0.56	-0.56	-1	-1	-1	-1	-1.2	-1.2
20	-0.56	-0.56	-1	-1	-1	-1	-1.2	-1.2
40	-0.56	-0.56	-1	-1	-1	-1	-1.2	-1.2
60	-0.56	-0.56	-1	-1	-1	-1	-1.2	-1.2
80	-0.56	-0.56	-1	-1	-1	-1	-1.2	-1.2
100	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-1.2	-1.2
120	-1	-1	-1	-1	-1	-1	-1.2	-1.2
150	-1	-1	-1	-1	-1	-1	-1.2	-1.2

13 **P2138** APP_uSync_CUR

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

14 **P057B** Brk_facEWMASlowTest_CUR

Brake Position Sensor Voltage (V)	0	0.0346	0.035	0.04	0.045	0.051	0.0512	5
factor (-)	0	0	0	0	0	0	1	1

15 **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

16 **P008F** CEngDsT_tDiffMaxLo_CUR

Table no.	Fault Codes	Label (Internal Manufacturer Reference)

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

17 **P0336** EpmCrS_facGapPlausHigh_CA

-	8	5.8125	3.375	3.375

18 **P0336** EpmCrS_facIncPlausHigh_CA

-	2	1.8125	1.5	1.5

19 **P02CD, P02CF, P02D1, P02D3, P02D5, P02D7, P02D9, P02DB** ETClb_pRailSet_CA

Rail Pressure Setpoint (kPa)	30000	70000	90000

20 **P02CD, P02CF, P02D1, P02D3, P02D5, P02D7, P02D9, P02DB** ETClb_tiET_MAX_CA

Injector Energizing Time (usec)	670.8	384.4	353.2

21 **P01CD, P01CF, P01D1, P01D3, P01D5, P01D7, P01D9, P01DB** ETClb_tiETFbOfsMax_CA

Injector Energizing Time (usec)	16	12	10

22 **P01CD, P01CF, P01D1, P01D3, P01D5, P01D7, P01D9, P01DB** ETClb_tiETFbOfsMin_CA

Injector Energizing Time (usec)	16	12	10

23 **P144B** ETCtl_stPOpCtVILopMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	900	2250	3000
0	0	1	1	0
40	0	1	1	0
200	0	1	1	0
240	0	0	0	0

24 **P144C** ETCtl_stPOpCtVILopMin_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	900	2250	3000
0	0	1	1	0
40	0	1	1	0
200	0	1	1	0
240	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
25	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
160	0	1	1	1
200	0	1	1	1

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	700	900	2250	3000
0	0	1	1	1
40	0	1	1	1
160	0	1	1	1
200	0	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
27	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)
28	P11DB	Exh_facLamStatNSCDs_CUR

-	0	3	4	5	6	7	8	9	10	15	16
-	0.1	0.1	1.25	1.5	3.848	3.889	4	6.484	10	10	10

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
29	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)
30	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)
31	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)
32	P0483	FanCtl_facDiaDrvSpd_CUR

Fan Speed (rpm)	400	1679	1680	1800	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)
33	**P0483**	FanCtl_facDiaDrvStab_CUR

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

34 **P0483** FanCtl_facDiaECT_CUR

Engine Coolant Temperature (°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

35 **P0483** FanCtl_facDiaIAT_CUR

Intake Air Temperature (°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

36 **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

37 **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	0.011	0.011	0.011	0.011	0.011	0.011	0.0105	0.0105	0.0105	0.0105	0.0115	0.011	0.011	0.0105

38 **P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284** FBC_qLimNeg_MAP

ECT (°C) / Inj. Qty (mm^3/rev)	0	8	52	76	448	464	472	480
-40.04	0	0	-48	-68	-68	-68	-68	-68
103.96	0	0	-48	-68	-68	-68	-68	-68
104.96	0	0	-48	-68	-68	-68	-68	-68
105.96	0	0	-48	-68	-68	-68	-68	-68
106.96	0	0	-48	-68	-68	-68	-68	-68
107.96	0	0	-48	-68	-68	-68	-68	-68
109.96	0	0	-48	-68	-68	-68	-68	-68
134.96	0	0	-48	-68	-68	-68	-68	-68

39 **P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284** FBC_qLimPos_MAP

ECT (°C) / Inj. Qty (mm^3/rev)	0	8	52	76	448	464	472	480
-40.04	0	0	48	68	68	68	68	68
103.96	0	0	48	68	68	68	68	68
104.96	0	0	48	68	68	68	68	68
105.96	0	0	48	68	68	68	68	68
106.96	0	0	48	68	68	68	68	68
107.96	0	0	48	68	68	68	68	68
109.96	0	0	48	68	68	68	68	68
134.96	0	0	48	68	68	68	68	68

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
43	P0171, P0172, P026C, P026D	FMO_facObsvrCmpnProtnRels_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	600	1200	1600	2200	2400	3000	3200
0	0	1	1	1	1	1	1	1
28	0	1	1	1	1	1	1	1
280	0	1	1	1	1	1	1	1
300	0	0	0	1	1	1	1	1
320	0	0	0	1	1	1	0	0
340	0	0	0	1	1	1	0	0
360	0	0	0	0	1	1	0	0
380	0	0	0	0	0	0	0	0

44	P026D	FMO_qFlSysThresMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	400	450	500	550	700	750	800	850
12	19.6	19.6	19.6	19.6	22.4	22.4	25.6	24
16	16	19.2	19.2	19.2	23.2	23.2	26	24
24	23.2	23.2	25.2	25.2	25.2	25.2	26	28
40	23.2	23.2	25.2	25.2	25.2	25.2	26	28
56	23.2	23.2	25.2	25.2	25.2	25.2	26	28
72	23.2	23.2	25.2	25.2	25.2	25.2	26	28
84	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8
100	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8

45	P026C	FMO_qFlSysThresMin_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	400	450	500	550	700	750	800	850
12	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8
16	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8
24	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8
40	-27.6	-27.6	-27.2	-21.6	-24.4	-24.4	-24.4	-25.2
56	-27.6	-27.6	-27.2	-21.6	-24.4	-24.4	-24.4	-25.2
72	-27.6	-27.6	-27.2	-21.6	-24.4	-24.4	-24.4	-25.2
84	-27.6	-27.6	-27.2	-21.6	-24.4	-24.4	-24.4	-25.2
100	-26	-26	-26	-21.6	-21.2	-21.2	-21.2	-20

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
46	P0172	FMO_qOBDMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	700	900	1000	1100	1200	1300	1500
40	46.12	54.04	62	65.96	69.92	73.88	77.84	101.64
80	52.44	60.36	68.28	72.24	76.2	80.16	84.12	107.92
120	58.72	66.64	74.6	78.56	82.52	86.48	90.44	114.24
160	65.04	72.96	80.88	84.84	88.8	92.76	96.72	120.52
180	68.16	76.12	84.04	88	91.96	95.92	99.88	123.68
200	71.32	79.24	87.2	91.16	95.12	99.08	103.04	126.84
240	77.64	85.56	93.48	97.44	101.4	105.36	109.32	133.12
280	109.12	117.04	125	128.96	132.92	136.88	140.84	164.64

47 **P0171** FMO_qOBDMin_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	700	900	1000	1100	1200	1300	1500
40	-46.12	-52.44	-58.72	-65.04	-68.16	-71.32	-77.64	-109.12
80	-54.04	-60.36	-66.64	-72.96	-76.12	-79.24	-85.56	-117.04
120	-62	-68.28	-74.6	-80.88	-84.04	-87.2	-93.48	-125
160	-65.96	-72.24	-78.56	-84.84	-88	-91.16	-97.44	-128.96
180	-69.92	-76.2	-82.52	-88.8	-91.96	-95.12	-101.4	-132.92
200	-73.88	-80.16	-86.48	-92.76	-95.92	-99.08	-105.36	-136.88
240	-77.84	-84.12	-90.44	-96.72	-99.88	-103.04	-109.32	-140.84
280	-101.64	-107.92	-114.24	-120.52	-123.68	-126.84	-133.12	-164.64

48 **P0171, P0172, P026C, P026D** FMO_stOutObsvr_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	600	1000	1200	1600	2200	2400	2800	3000	3200
0	0	0	0	0	0	0	0	0	0	0
16	0	1	1	1	1	1	1	1	1	1
240	0	1	1	1	1	1	1	1	1	1
260	0	1	1	1	1	1	1	1	1	1
280	0	1	1	1	1	1	1	1	1	1
300	0	0	0	0	1	1	1	1	1	1
320	0	0	0	0	1	1	1	1	0	0
340	0	0	0	0	1	1	1	0	0	0
360	0	0	0	0	0	1	1	0	0	0
380	0	0	0	0	0	0	0	0	0	0

49 **P11B4, P11B5** Hegn_facLamDiaFdbk_CUR

-	0	3	5	6	7	8	9	10
factor (-)	0.1	0.1	1.25	3.848	3.889	4	6.484	10

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
50	P054F	InjCtl_qDesGearMonMax_MAP

ECT (°C) / Engine Speed (rpm)	0	400	600	800	1000	5000
-20.04	244.4	244.4	244.4	244.4	244.4	244.4
-10.04	217.6	217.6	217.6	217.6	217.6	217.6
-0.04	190.8	190.8	190.8	190.8	190.8	190.8
19.96	160	160	160	160	160	160
39.96	136	136	136	136	136	136
69.96	122.8	122.8	122.8	128.8	128.8	128.8

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
54	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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
55	P0606	MoFInjQnt_tiZFCETMax_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
56	P0606	MoFInjQnt_tiZFCETMin_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
57	P0606	MoFOvR_nEngStrtThres_CUR

ECT (°C)	-40	-30.4	-16	-10.4	9.6	20	29.6	40
Engine Speed (rpm)	1080	1040	960	960	960	960	920	840

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
58	P0606	MoFOvR_tiLimET_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
59	P2263	PCR_facMaxUndrBstDvt_CUR

Environmental Pressure (kPa)	70	75	80	85	90	95	100	112.5
factor (-)	0.900024	0.9	0.95	0.95	1	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
60	P0234	PCR_facPresDvtCorMin_CUR

Environmental Pressure (kPa)	50	75	80	85	90	97.5	106.4	125
factor (-)	0.800049	0.7	0.7	0.75	0.8	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
61	P0299	PCR_pMaxDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	1300	1500	1600	1800	2000	2500	3000
140	21	21	19	19	20	25	25	25
160	24	24	22	22	22.5	25	25	25
200	27	27	25	25	22.5	25	25	25
240	30	30	28	25	25	27.5	27.5	27.5
280	33	33	31	31	27.5	28	28	28
320	36	36	34	34	30	30	30	30
360	36	36	35	35	35	35	35	35
400	40	40	40	40	40	40	40	40

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
62	P0234	PCR_pMinDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	1500	1600	1700	1800	2000	2500	3000
140	-10	-10	-10	-10	-10	-11.7	-27	-31.5
160	-10	-10	-10	-10	-10	-12.5	-27	-31.5
200	-10	-10	-10	-10	-14.5	-16	-27	-31.5
240	-12.5	-12.5	-12.5	-12.5	-20	-25.2	-27	-31.5
280	-15.3	-15.3	-18.6	-22.5	-22.5	-25.2	-27	-31.5
320	-17.6	-17.6	-22.1	-27.5	-27.5	-27.5	-30	-31.5
360	-19.8	-19.8	-24.3	-30	-30	-30	-30	-31.5
400	-22.1	-22.1	-25.2	-30	-30	-30	-30	-31.5

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
63	P2263	PCR_pOvrBstDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	750	1000	1500	2000	2500	3000	3500
0	-80	-80	-80	-80	-80	-60	-40	-40
60	-80	-80	-80	-80	-80	-60	-40	-40
120	-80	-80	-80	-80	-80	-60	-40	-40
180	-80	-80	-80	-80	-80	-60	-40	-40
240	-65	-65	-65	-65	-65	-55	-45	-45
300	-50	-50	-50	-50	-50	-50	-50	-50
360	-50	-50	-50	-50	-50	-50	-50	-50
480	-50	-50	-50	-50	-50	-50	-50	-50

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
64	P2263	PCR_pUndrBstDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	750	1000	1500	2000	2500	3000	3500
0	45	45	45	45	45	45	45	45
60	45	45	45	45	45	45	45	45
120	45	45	45	45	45	45	45	45
180	45	45	45	45	45	45	45	45
240	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
300	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
360	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
480	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5

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

g	0	5	10	20	30	45
Soot Mass (g)	0	61	122	244	366	549

67	**P128E**	Rail_pCPCFltMin_CUR

Engine Speed (rpm)	580	630
Rail Pressure (kPa)	0	15000

68	**P0087**	Rail_pMeUnDvtMax_CUR

Engine Speed (rpm)	580	630
Rail Pressure (kPa)	80000	11000

69	**P0088**	Rail_pMeUnDvtMin_CUR

Engine Speed (rpm)	580	630
Rail Pressure (kPa)	-80000	-18000

70	**P128E**	Rail_pMeUnFltMin_CUR

Engine Speed (rpm)	580	630
Rail Pressure (kPa)	0	15000

71	**P0087**	Rail_pPCVDvtMax_CUR

Engine Speed (rpm)	580	630
Rail Pressure (kPa)	80000	11000

72	**P128E**	Rail_pPCVFltMin_CUR

Engine Speed (rpm)	580	630
Rail Pressure (kPa)	0	15000

74	**P11CB**	SCRChk_idcPOpMaxNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2001	2500	2600	3000
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
120	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
160	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
200	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
200.4	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
260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2001	2500	2600	3000
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
120	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
160	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
200	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
200.4	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
260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

76 **P20EE, P2BAD** SCRChk_mEstNH3LdMax_CUR

SCR Temperature (°C)	249.96	259.96	264.96	269.96	279.96	289.96	299.96	324.96
Ammonia Load (g)	2.2	2.2	2.2	2.2	2	2	2	2

77 **P20EE, P2BAD** SCRChk_mEstNH3LdMin_CUR

SCR Temperature (°C)	249.96	259.96	264.96	269.96	279.96	289.96	299.96	349.96
Ammonia Load (g)	0.75	0.65	0.55	0.45	0.35	0.25	0.15	0.05

78 **P20EE, P2BAD** SCRChk_mNH3LdDvtMax_CUR

SCR Temperature (°C)	249.96	259.96	269.96	279.96	289.96	299.96	309.96	319.96
Ammonia Load (g)	0.25	0.25	0.25	0.25	0.2	0.15	0.15	0.15

79 **P20EE, P2BAD** SCRChk_mNH3LdDvtMin_CUR

SCR Temperature (°C)	249.96	259.96	269.96	279.96	289.96	299.96	309.96	319.96
Ammonia Load (g)	-0.5	-0.5	-0.45	-0.4	-0.35	-0.1	-0.1	-0.1

80 **P11CC** SCRChk_rNOxDiffThresBasMinUs_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	800	900	1000	1200	1400	1600	1800	2000	2001	2400
40	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
60	-1	-1	-1	-0.4924	-0.4916	-0.4932	-0.4795	-0.4905	-0.4905	-1
80	-1	-1	-1	-0.4924	-0.4916	-0.4932	-0.4795	-0.4905	-0.4905	-1
120	-1	-1	-1	-0.4862	-0.4645	-0.4934	-0.4974	-0.4832	-0.4832	-1
160	-1	-1	-1	-0.4923	-0.5088	-0.4922	-0.4971	-0.4718	-0.4718	-1
200	-1	-1	-1	-0.5188	-0.4822	-0.4965	-0.507	-0.4894	-0.4894	-1
200.4	-1	-1	-1	-0.5188	-0.4822	-0.4965	-0.507	-0.4894	-0.4894	-1
220	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
240	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
260	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

81 **P11CB, P11CC** SCRChk_stExhTempRlsUsPlaus_CUR

Exhaust Temp (°C)	-0.04	88.96
factor (-)	0	1

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

Fuel Injector Pattern (-)	24	56	58	26	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
83	**P20EE**	SCRChk_stPOpSelEta1_MAP

Filtered 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	0	0	0	0	0	0	0	0	0	0	0	0	0
69.44	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
80.56	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
83.33	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
97.22	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
102.78	0	0	0	1	1	1	1	1	1	1	0	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	1	0	0	0	0
127.78	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
136.11	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
144.44	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
152.78	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
161.11	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0
169.44	0	0	0	0	0	0	0	0	0	1	1	1	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	**P2BAD**	SCRChk_stPOpSelEta2_MAP

Filtered 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	0	0	0	0	0	0	0	0	0	0	0	0	0
69.44	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0
83.33	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
97.22	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0
100.00	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
102.78	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
111.11	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
119.44	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
127.78	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
136.11	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
144.44	0	0	0	1	1	1	1	1	1	1	1	1	1	1	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
175.00	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)
85	**P20EE, PBAD**	SCRChk_tDeltaTempSCRMax_CUR

Filtered SCR Temp (°C)	249.96	259.96	269.96	279.96	289.96	299.96	309.96	319.96
Delta SCR Temp (°C)	59.96	59.96	59.96	59.96	64.96	64.96	64.96	64.96

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
88	**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
3	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)
90	**P10D0**	SCRPOD_tMaxDiff_CUR

Engine Off Time (sec)	0	299	300	28799	28800	32000	32500	32767
Delta Temperature (°C)	3276.7	3276.7	3276.7	3276.7	30	30	30	30

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

BARO Pressure (kPa) / ECT at Start (°C)	-40.04	-30.04	-16.04	-10.04	9.96	19.96	29.96	39.96
65	850	800	735	735	735	735	675	600
70	850	800	735	735	735	735	675	600
75	850	800	735	735	735	735	675	600
80	850	800	735	735	735	735	675	600
85	850	800	735	735	735	735	675	600
90	834	790	720	720	720	720	660	600
95	834	790	720	720	720	720	660	600
100	834	790	720	720	720	720	660	600

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

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
93	**P01CB, P01CD, P01D7, P01D9, P01D1, P01D3, P01D5, P01CF, P01CC, P01CE, P01D8, P01DA, P01D2, P01D4, P01D6, P01D0**	ZFC_stGearRls_CA

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
94	**P01CB, P01CD, P01D7, P01D9, P01D1, P01D3, P01D5, P01CF, P01CC, P01CE, P01D8, P01DA, P01D2, P01D4, P01D6, P01D0**	ZFC_tiCldCham_CUR

ECT (°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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
95	**P113A**	

Engine Off Time (sec)	0	299	300	28799	28800	32000	32500	32767
Delta Temperature (°C)	3276.7	3276.7	3276.7	3276.7	30	30	30	30

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
96	P054E	InjCtl_qDesGearMonMin_MAP

ECT (°C) / Engine Speed (rpm	0	400	600	800	1000	5000
-20.04	161.6	161.6	161.6	161.6	161.6	161.6
-10.04	134.8	134.8	134.8	134.8	134.8	134.8
-0.04	108	108	108	108	108	108
19.96	77.2	77.2	77.2	77.2	77.2	77.2
39.96	53.2	53.2	53.2	53.2	53.2	53.2
69.96	40	40	40	46	46	46

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
97	P0299	PCR_facPresDvtCorMax_CUR

Environmental Pressure (kPa)	50	59.4	68.8	75	82.5	97.5	101.5	103
factor (-)	1.099976	1.1	1.1	1.1	1.1	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
99	P11D7, P22FE	Hegn_VdSlfDiagB1S2.tiDlyHCUnLd_CUR

HC Loading Time (sec)	0	1	2	3	4	5	10	20	50	100	300	600	900	1800	3600	7200
Diagnostic Delay Time (sec)	100.00	100.00	100	100	100	100	100	100	100	100	100	100	150	300	600	900

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
100	P20EE	SCRChk_facEtaEstOfs1_MAP

Exhaust Mass Flow (g/sec) / SCR Temperature (°C)	239.96	249.96	259.96	269.96	279.96	289.96	299.96	309.96
61.11	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
69.44	-0.225	-0.225	-0.225	-0.225	-0.225	-0.225	-0.225	-0.225
77.78	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15
86.11	-0.125	-0.125	-0.125	-0.125	-0.125	-0.125	-0.125	-0.125
94.44	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
102.78	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
111.11	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
119.44	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
101	P20EE, P2BAD	SCRChk_tDeltaTempSCRMin_CUR

Filtered SCR Temp (°C)	249.96	259.96	269.96	279.96	289.96	299.96	304.96	319.96
Delta SCR Temp (°C)	-50.04	-50.04	-25.04	-25.04	-5.04	-5.04	-0.04	-0.04

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
102	P2BAD	SCRChk_facEtaEstOfs2_MAP

Exhaust Mass Flow (g/sec) / SCR Temperature (°C)	239.96	249.96	259.96	269.96	279.96	289.96	299.96	309.96
61.11	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
69.44	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
77.78	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
86.11	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
94.44	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
102.78	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
111.11	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
119.44	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125

Table no.	Status or State	Label (Internal Manufacturer Reference)
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)	0.01	0.03	0.05	0.09	0.12	0.13	0.14	0.15	0.16	0.18	0.19	0.20

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	0.53	0.83	1.07	1.62	1.96	2.19	3.21
2.78	0	0.55	0.87	1.12	1.70	2.05	2.29	3.37
5.56	0	0.55	0.87	1.12	1.70	2.05	2.29	3.37
8.33	0	0.55	0.87	1.12	1.70	2.05	2.29	3.37
11.11	0	0.58	0.91	1.18	1.79	2.16	2.41	3.40
13.89	0	0.58	0.91	1.18	1.79	2.16	2.41	3.40
25.00	0	0.58	0.91	1.18	1.79	2.16	2.41	3.40
36.11	0	0.62	0.97	1.26	1.91	2.30	2.57	3.40

Table no.	Status or State	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	0.05	0.10	0.20	0.34	0.60	1.03	1.72	2.81

Table no.	Status or State	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.	Status or State	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)	100	15	15	15	3	3	3	3

Table no.	Status or State	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.	Status or State	Label (Internal Manufacturer Reference)
9	**Overdosing detected**	SCRAd_mNOxOvrMetPh3_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	424.96
Nox Mass (g)	-0.7	-0.6	-0.6	-0.6

Table no.	Status or State	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.	Status or State	Label (Internal Manufacturer Reference)

11 **Request for pre controlled dosing** SCRFFC_stNQntCurrHi_MAP

	104	136	160	192	216	256	320	408	480	720	800	801.6
Engine Speed (rpm) / Injection Qty. (mm^3/rev)	26	34	40	48	54	64	80	102	120	180	200	200.4
800	7	7	7	7	7	7	7	7	7	7	7	7
1200	7	7	7	7	7	7	7	7	7	7	7	7
1400	7	7	7	7	7	7	7	7	7	7	7	7
1475	7	7	7	7	7	7	7	7	7	7	7	7
1700	7	7	7	7	7	7	7	7	7	7	7	7
2000	7	7	7	7	7	7	7	7	7	7	7	7
2200	7	7	7	7	7	7	7	7	7	7	7	7
2400	7	7	7	7	7	7	7	7	7	7	7	7
2600	7	7	7	7	7	7	7	7	7	7	7	7
2800	7	7	7	7	7	7	7	7	7	7	7	7
3000	7	7	7	7	7	7	7	7	7	7	7	7
3200	7	7	7	7	7	7	7	7	7	7	7	7

12 **Request for pre controlled dosing** SCRFFC_stNQntCurrMid_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	26	34	40	48	54	64	80	102	120	180	200	200.4
800	2	2	2	2	3	10	10	10	10	10	10	10
1200	10	10	10	10	10	10	10	10	10	10	10	10
1400	10	10	10	10	10	10	10	10	10	10	10	10
1475	10	10	10	8	7	4	4	2	2	2	2	10
1700	10	10	10	8	7	4	2	2	2	2	2	10
2000	10	10	10	8	7	4	2	2	2	2	2	10
2200	10	10	8	6	4	2	2	2	2	2	2	10
2400	10	10	8	6	4	2	2	2	2	2	2	10
2600	10	8	6	4	3	2	2	2	2	2	2	10
2800	10	8	5	4	3	2	2	2	2	2	2	10
3000	10	8	5	4	3	2	2	2	2	2	2	10
3200	10	8	7	5	4	4	4	4	4	4	5	10

13 **Request for pre controlled dosing** SCRFFC_stNQntCurrSeaLvl_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	26	34	40	48	54	64	80	102	120	180	200	200.4
800	0	0	0	0	3	10	10	10	10	10	10	10
1200	10	10	10	10	10	10	10	10	10	10	10	10
1400	10	10	10	10	10	10	10	10	10	10	10	10
1475	10	10	10	8	7	4	4	0	0	0	0	3
1700	10	10	10	8	7	4	0	0	0	0	0	3
2000	10	10	10	8	7	4	0	0	0	0	0	3
2200	10	10	8	6	4	2	0	0	0	0	0	3
2400	10	10	8	6	4	2	0	0	0	0	0	3
2600	10	8	6	4	3	0	0	0	0	0	0	3
2800	10	8	5	4	3	0	0	0	0	0	0	3
3000	10	8	5	4	3	0	0	0	0	0	0	3
3200	10	8	7	5	4	4	4	4	4	4	4	4

15 OBDG12 ECM Diagnostic Calibration Status and State Tables

Table no.	Status or State	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.	Status or State	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	95.46	89.96
20	109.96	109.96	109.96	107.96	100.26	94.96
50	109.96	109.96	109.96	108.96	107.96	103.96
60	109.96	109.96	109.96	109.96	109.96	105.96
100	109.96	109.96	109.96	109.96	109.96	107.96
150	109.96	109.96	109.96	109.96	109.96	109.96

Table no.	Status or State	Label (Internal Manufacturer Reference)
16	**Release of tank heater circuit**	UHC_tiC1Dfrst_CUR

Reductant Tank Temp. (°C)	-30.04	-18.04	-15.04	-11.04	-8.04	-0.04	4.96	5.06
Reductant Heater Time (sec)	3277	3277	3277	3277	300	300	300	0

Table no.	Status or State	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.	Status or State	Label (Internal Manufacturer Reference)
18	**Release of tank heater circuit**	UHC_tiDfrstC2_CUR

Reductant Tank Temp. (°C)	-35.04	-25.04	-18.04	-10.04	-8.04	-5.04	-0.14	-0.04
Reductant Heater Time (sec)	3276.7	3276.7	3000	600	300	300	200	0

Table no.	Status or State	Label (Internal Manufacturer Reference)
19	**Release of tank heater circuit**	UHC_tiDfrstC3_CUR

Reductant Tank Temp. (°C)	-35.04	-25.04	-18.04	-10.04	-8.04	-5.04	-0.14	-0.04
Reductant Heater Time (sec)	3276.7	3276.7	3000	600	300	300	200	0

Table no.	Status or State	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	90	0

Table no.	Status or State	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	90	0

15 OBDG12 ECM Closed Loop Enable Conditions Calibration Tables

Table no.	Closed Loop Enable Condition Parameter Summary	Label (Internal Manufacturer Reference)
22	**EGR Closed Loop - Overlong Idle Time Delay**	AirCtl_tiDbShOffExtdIdl_MAP

EGR Cooler Efficiency / Upstream EGR Temperature	79.96	129.96	139.96	149.96	169.96	199.96	249.96	299.96
0.30	0	0	40	50	60	70	80	135
0.40	0	0	40	50	60	70	80	135
0.50	0	0	40	50	60	70	80	135
0.60	0	0	40	60	70	80	90	145
0.70	0	0	40	60	70	80	90	145
0.80	0	0	50	65	75	85	95	150
0.90	0	0	50	65	75	85	95	150
1.00	0	0	50	65	75	85	95	150

23	**EGR Closed Loop - Injection Quantity too Large**	AirCtl_q2HiEOM_MAP

CAC Downstream Temperature / Engine Speed	600	1000	1200	1400	1800	2200	2600	2800	3000	3200	3400	3600
-40.04	220	220	340	340	380	380	380	380	380	340	340	400
-20.04	220	220	320	320	380	380	380	380	380	340	340	400
-0.04	220	220	320	320	380	380	380	380	380	340	340	400
19.96	220	220	300	300	340	340	340	300	300	280	280	400
39.96	220	220	300	300	300	340	340	300	300	280	220	400
49.96	220	220	220	220	260	300	300	260	260	220	220	400

24	**Intake Manifold Pressure Cold Start**	PCR_tiCldStrt_CUR

Coolant Temperature (^{o}C)	-50.14	-45.14	-40.14	-35.14	-30.14	-25.14	-20.14	-15.14	-10.14	-5.14	-0.14	4.86	9.86	14.86	19.86	24.86	29.86
Engine Run Time (sec)	300	250	200	180	150	145	120	110	100	90	75	45	35	25	15	5	5
					34.86	39.86	44.86	49.86	54.86	59.86	64.86	69.86	74.86	79.86	84.86	89.86	94.86
					5	5	5	5	5	5	5	5	5	5	5	5	5

25	**Intake Manifold Closed Loop EGR Contol OFF High Altitud**	PCR_GovOnEGROffHi_CUR

Engine RPM (RPM)	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400
Commanded Fuel (mm3/rev)	340	340	340	280	200	180	180	140	120	120	100	100	100	80	80	80	80
										3600	3800	4000	4200	4400	4600	4800	5000
										80	80	80	80	80	80	80	80

26	**Intake Manifold Closed Loop EGR Contol OFF Medium Altit**	PCR_GovOnEGROffMed_CUR

Engine RPM (RPM)	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400
Commanded Fuel (mm3/rev)	340	340	340	340	280	200	180	180	140	120	120	100	100	100	80	80	80
										3600	3800	4000	4200	4400	4600	4800	5000
										80	80	80	80	80	80	80	80

27	**Intake Manifold Closed Loop EGR Contol OFF Low Altitude**	PCR_GovOnEGROffSea_CUR

Engine RPM (RPM)	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400
Commanded Fuel (mm3/rev)	340	340	340	340	280	200	180	180	140	120	120	100	100	100	80	80	80
										3600	3800	4000	4200	4400	4600	4800	5000
										80	80	80	80	80	80	80	80

15 OBDG12 ECM Closed Loop Enable Conditions Calibration Tables

Table no.	Closed Loop Enable Condition Parameter Summary	Label (Internal Manufacturer Reference)
28	**Intake Manifold Closed Loop High Altitude**	PCR_GovOnHi_CUR

Engine RPM (RPM)	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400
Commanded Fuel (mm3/rev)	340	340	340	340	280	200	180	180	140	120	120	100	100	100	80	80	80
										3600	3800	4000	4200	4400	4600	4800	5000
										80	80	80	80	80	80	80	80

Table no.	Closed Loop Enable Condition Parameter Summary	Label (Internal Manufacturer Reference)
29	**Intake Manifold Closed Loop Medium Altitude**	PCR_GovOnMed_CUR

Engine RPM (RPM)	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400
Commanded Fuel (mm3/rev)	340	340	340	340	280	200	180	180	140	120	120	100	100	100	80	80	80
										3600	3800	4000	4200	4400	4600	4800	5000
										80	80	80	80	80	80	80	80

Table no.	Closed Loop Enable Condition Parameter Summary	Label (Internal Manufacturer Reference)
30	**Intake Manifold Closed Loop Low Altitude**	PCR_GovOnSea_CUR

Engine RPM (RPM)	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400
Commanded Fuel (mm3/rev)	340	340	340	340	280	200	180	180	140	120	120	100	100	100	80	80	80
										3600	3800	4000	4200	4400	4600	4800	5000
										80	80	80	80	80	80	80	80

Table no.	Closed Loop Enable Condition Parameter Summary	Label (Internal Manufacturer Reference)
31	**FBC Closed Loop Fuel Quantity**	FBC_qGvrnThresMax_CUR

Engine Speed (rpm)	800	1500	2000	2700
Fuel Quantity (mm3/rev)	200	380	380	200

15 OBDG12 ECM Diagnostic Inhibit Table

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																
P014C - HO2S Slow Response Rich to Lean Sensor 1	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1											
P0171 - Fuel Trim System Lean	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1															
P0172 - Fuel Trim System Rich	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1															
P0182 - Fuel Temperature Sensor 1 Circuit Low	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced	
P0183 - Fuel Temperature Sensor 1 Circuit High	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced	
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																
P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P2181 - Engine Thermostat stuck open																
P0201 - Injector 1 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0202 - Injector 2 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0203 - Injector 3 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0204 - Injector 4 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0205 - Injector 5 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0206 - Injector 6 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0207 - Injector 7 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0208 - Injector 8 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded
	P01DA - Cylinder 8 Injection Timing Advanced	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High														
P0234 - Turbocharger Engine Overboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1															
P0299 - Turbocharger Engine Underboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1															
P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1														

15 OBDG12 ECM Diagnostic Inhibit Table

Active DTC	Inhibited DTCs								
P026D - Injection Quantity Too High	P026C - Injection Quantity Too Low	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1						
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
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								
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							
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						

15 OBDG12 ECM Diagnostic Inhibit Table

Active DTC	Inhibited DTCs												
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											
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											
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									

15 OBDG12 ECM Diagnostic Inhibit Table

Active DTC	Inhibited DTCs																
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													
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								
P249D - Closed loop Reductant Injection Control at Limit-Flow too high	P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1																
P249E - Closed loop Reductant Injection Control at Limit-Flow too low	P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1																
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														
Fuel Level less than 15%	P0087 - Fuel Rail Pressure Too Low	P0088 - Fuel Rail Pressure Too High	P0191 - Fuel Rail Pressure Sensor Performance	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	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	P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P128E - Fuel Rail Pressure Performance											

15 OBDG12 ECM Diagnostic Enable Table

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)								
P00EA - Intake Air Temperature (IAT) 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 Run Time is 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)		
P00EB - Intake Air Temperature (IAT) 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 Run Time is 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)		
P00F4 - Humidity 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 is 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)		
P00F5 - Humidity 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 is 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)		
P00F6 - Humidity Sensor Circuit Intermittent/Erratic	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 is 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)		
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)		

DTC	Additional Basic Enable Conditions								
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)				
P0131 - HO2S Bank 1 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)	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)	
P0132 - HO2S Bank 1 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)	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)	
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)	
P014C - HO2S Slow Response Rich to Lean 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 is 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)
P0171 - Fuel Trim System Lean	System is not in active regeneration mode								
P0172 - Fuel Trim System Rich	System is not in active regeneration mode								
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)								
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							
P01CB - 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)						
P01CC - 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)						
P01CD - 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)						
P01CE - 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)						
P01CF - 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)						

DTC	Additional Basic Enable Conditions								
P01D0 - 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)						
P01D1 - 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)						
P01D2 - 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)						
P01D3 - 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)						
P01D4 - 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)						
P01D5 - 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)						
P01D6 - 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)						
P01D7 - 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)						
P01D8 - 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)						
P01D9 - 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)						
P01DA - 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)						
P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring 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)				
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)
P026C - Injection Quantity Too Low	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Power Take-Off (PTO) is not engaged	System is not in active regeneration mode					
P026D - Injection Quantity Too High	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Power Take-Off (PTO) is not engaged	System is not in active regeneration mode					
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							

DTC		Additional Basic Enable Conditions									
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)					
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)		

15 OBDG12 ECM Diagnostic Enable Table

DTC		Additional Basic Enable Conditions							
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)	
P057C - Brake Pedal Position Sensor Circuit High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P057D - Brake Pedal Position Sensor Circuit Low Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
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)		
P0627 - Fuel Pump Relay Control Circuit		battery voltage is above 11 V for at least 3s							
P0628 - Fuel Pump Relay Control Circuit Low		battery voltage is above 11 V for at least 3s							
P0629 - Fuel Pump Relay Control Circuit High		battery voltage is above 11 V for at least 3s							
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						

DTC		Additional Basic Enable Conditions						
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					
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)						
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			
P10D0 - Reductant Injector Temperature - Exhaust Gas Temperature 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)		
P111F - Fuel Temperature 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)		

DTC	Additional Basic Enable Conditions										
P11A6 - HO2S Performance - Signal High During Moderate Load 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)			
P11A9 - HO2S Performance - Signal Low During Moderate Load 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)			
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)			
P11B4 - HO2S Current Performance 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)			
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)										
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									
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									
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)					

DTC		Additional Basic Enable Conditions							
P154A - Intake Air (IA) Heater Feedback 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						
P154B - Intake Air (IA) Heater Voltage Signal 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						
P154C - Intake Air (IA) Heater Current Signal 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						
P154D - Intake Air (IA) Heater Temperature Signal 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						
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						
P1631 - Theft Deterrent Fuel Enable Signal Not Correct		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)					
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						
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)
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)	

DTC	Additional Basic Enable Conditions						
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)
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			
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)		

DTC		Additional Basic Enable Conditions									
P20E8 - Reductant Pressure Too Low		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
P20E9 - Reductant Pressure Too High		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
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)
P214F - Reductant Heater 1 Current Too High		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)			
P21DD - Reductant Heater 1 Current Too Low		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
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								
P221C - Reductant Heater 2 Current Too Low		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
P221D - Reductant Heater 2 Current Too High		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
P221E - Reductant Heater 3 Current Too Low		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
P221F - Reductant Heater 3 Current Too High		SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 is 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)		
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)			

DTC	Additional Basic Enable Conditions									
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)		
P22FA - NOx Sensor 1 Performance - Slow Response High to 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 is 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)	
P2428 - Exhaust Gas High 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)					
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								
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								
P2459 - Diesel Particulate Filter Regeneration Frequency	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa								
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)				

DTC	Additional Basic Enable Conditions									
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					
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	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	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)									
P2BAD - Exhaust NOx Concentration High - Unknown Reason	SCR Reductant Level not in restriction or empty level state (see parameter definitions for 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 the ambient air temperature is >= -7°C and the reductant tank temperature is >= -7°C	Engine Run Time is 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							

DTC		Additional Basic Enable Conditions						
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			

15 OBDG12 GPCM Summary Tables

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
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

ISSUED: ML-FP003

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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
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 = volts = 0 volts ± 3	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

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Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 - glow plug open	P0671	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
Cylinder 1 - 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
Cylinder 1 - 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
Cylinder 1 - 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
Cylinder 2 - glow plug open	P0672	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
Cylinder 2 - 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
Cylinder 2 - 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

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 - 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
Cylinder 3 - glow plug open	P0673	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
Cylinder 3 - 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
Cylinder 3 - 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
Cylinder 3 - 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
Cylinder 4 - glow plug open	P0674	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
Cylinder 4 - 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

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 - 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
Cylinder 4 - 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
Cylinder 5 - glow plug open	P0675	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
Cylinder 5 - 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
Cylinder 5 - 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
Cylinder 5 - 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
Cylinder 6 - glow plug open	P0676	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

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 - 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
Cylinder 6 - 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
Cylinder 6 - 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
Cylinder 7 - glow plug open	P0677	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
Cylinder 7 - 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
Cylinder 7 - 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
Cylinder 7 - 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.
Cylinder 8 - glow plug open	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
Cylinder 8 - 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
Cylinder 8 - 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
Cylinder 8 - 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
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

ISSUED: ML-FP003

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	> 16.0 Volt > 9.5 volts < 14.0 Volt	DTCs not active Path 1 IAH Commanded	P0640, P154D, P154C, P166B = ON	1s (internal) + 75% failure over 4 seconds.	B
			PATH2: Voltage signal line IAH Battery voltage	> 1.5 Volt	Path 2 IAH Commanded	= OFF for more then 65 msec		
			OR PATH3: IAH Battery voltage AND GPCM IGN voltage AND GPCM Battery Voltage IAH Battery voltage	< 6.9 Volt > 6.9 Volt < 16.0 volt > 9.5 Volt	Path 3 DTCs not active IAH Commanded	P064C, P154D, P154C, P166B = ON		
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	< 20 Amps > 0.9 Volts	DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage	P154B, P154D, P0640, P0154A = ON > 6.9 Volt >= 6.9 Volt	up to 5000ms (internal) + 75% failure over 4 seconds.	B
			or		or			
			PATH2: IAH current IAH voltage signal feedback to GPCM	< 20 Amps < 0.9 Volts	DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage	P154B, P154D, P0640, P0154A = ON > 6.9 Volt >= 6.9 Volt		
			or		or			
			PATH3:IAH current signal feedback to GPCM	> 4.96 Volts	IAH Command	= off		
			or		or			
			PATH 4:IAH grid current IAH heater grid calculated resistance	> 20 A > 500 mOhm	DTC's are not set IAH Commanded Battery Voltage at IAH	P154B, P154D, P0640, P0154A = ON > 8.0 Volt		

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	< 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,	650ms (internal) + 75% failure over 4 seconds.	B
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 sec < 6.9 Volt 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

ISSUED: ML-FP003

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,P0675 = 0 or 100 %	1000ms (internal) + 75% failure over 4.0 seconds.	B
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
Glow Plug Control Module Temperature-Intake Air Heater Temperature Not	P16A8	ECM monitors serial data from GPCM for P16A8 Error Message indicating GPCM detects GPCM temperature and IAH temperature are not plausible	Tenperature difference between internal temperature of GPCM and internal temperature of IAH module	> absolute 22 °C	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D	>= 8 hours > -7 °C > 10,5 V = 100 % = not set	83% failure over 3.0 seconds.	B

ISSUED: ML-FP003

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Heater Temperature Sensor Circuit Low Voltage	P16AA	ECM monitors serial data from GPCM for P16AA Error Message indicating GPCM detects IAH temperature sensore voltage out of range low	IAH temperature sensor voltage	< threshold selected by look-up table refer to table 1 in sheet "Look-Up Tables" mV	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D or IAH Run Time and IAH PWM Intake Air Temperature (GMLAN) IAH Battery Voltage and DTC P154D or Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D	>= 8 hours >= -7 °C > 11 V = 100 % = not set > 120 sec = 100 % > -35 °C > 11 V = not set > 25 °C > 11 V = 100 % = not set	inner loop: 1310 ms total time: 1810 ms	B
Intake Air Heater Temperature Sensor Circuit High Voltage	P16AB	ECM monitors serial data from GPCM for P16AB Error Message indicating GPCM detects IAH temperature sensore voltage out of range high	PATH1: IAH temperature sensor voltage PATH2: IAH temperature sensor voltage	> IAH Battery Voltage * 158/512 V > V IAH Battery Voltage* 146/512	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and DTC P154D or IAH Run Time and IAH PWM and Intake Air Temperature (GMLAN) and DTC P154D or Intake Air Temperature (GMLAN) and DTC P154D (Engine Off Timer (GMLAN) or Intake Air Temperature (GMLAN)) and (IAH Run Time or IAH PWM or Intake Air Temperature (GMLAN)) and (Engine Coolant Temperature (GMLAN)	>= 8 hours >= -7 °C = not set > 120 sec > 90 % > -35 °C = not set > 25 °C = not set < 8 hours < -7 °C < 120 sec < 90 % < -35 °C < 60 °C	inner loop: 655 ms total time: 1155 ms	B

ISSUED: ML-FP003

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Temperature Sensor Circuit Low Voltage	P16AD	ECM monitors serial data from GPCM for P16AD Error Message indicating GPCM detects GPCM temperature sensore voltage out of range low	PATH 1: GPCM temperature sensor voltage	<	210	mV	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) or Engine Coolant Temperature (GMLAN) and Intake Air Temperature (GMLAN)	>= >= > >	8 -7 70 -10	hours °C °C °C	inner loop: 1310 ms total time: 1810 ms	B
			PATH 2: GPCM temperature sensor voltage	<	615	mV	(Engine Off Timer (GMLAN) or Intake Air Temperature (GMLAN)) and (Engine Coolant Temperature (GMLAN) or Intake Air Temperature (GMLAN))	< < <= <=	8 -7 60 -10	hours °C °C °C		
Glow Plug Control Module Temperature Sensor Circuit High Voltage	P16AE	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensore voltage our of range high	GPCM temperature sensor voltage	>	4,94	V	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) or Engine Coolant Temperature (GMLAN) and Intake Air Temperature (GMLAN)	>= >= > >	8 -7 70 -10	hours °C °C °C	inner loop: 1310 ms total time: 1810 ms	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 7.0	 °C 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	>	25	A	reductan heater commanded: GPCM temperature GPCM Battery supply voltage	= < > <	ON 123 7.0 16.5	 °C Volts Volts	1000ms (internal) + 50% failure over 1.0 seconds.	B
			or		or		or	or	or	or		
			Path 2: Hardware over current	>	80	A	reductan heater commanded: GPCM temperature GPCM Battery supply voltage	= < > <	ON 123 7.0 16.5	 °C Volts Volts		
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

ISSUED: ML-FP003

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit	P20BD	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
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
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

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Nox Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	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
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
GMLAN Communication ECM -> GPCM	U0106	ECM monitors serial data from GPCM for U0106. Error Message indicating GPCM is not receiving major GMLAN signals.	Timeout of message $C9 or Timeout of message $4C1 or Timeout of message $4F1	> 100 ms > 2000 ms > 3000 ms	Ignition 1 battery voltage at GPCM	> 3.9 volts > 7.0	inner loop: 10000 ms total time: 11000 ms	B

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