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	<	-25.00	degrees	Engine backward rotation detected	=	FALSE	-	fail conditions exists for more than 2 events test performed continuously 0.01 s rate	B
			OR average value of camshaft offset	>	25.00	degrees	and NO pending or confirmed DTCs	=	see sheet inhibit tables	-		
							and Ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
HO2S Heater Control Circuit Bank 1 Sensor 1 Circuit	P0030	Monitoring the HO2S heater control circuit for open circuit failures	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	Ignition on	=	TRUE	-	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	B
							HO2S heater control commanded on	=	FALSE	-		
							basic enable conditions met:	=	TRUE	-		
HO2S Heater Control Circuit Bank 1 Sensor 1 Circuit Low	P0031	Monitoring the HO2S heater control circuit for circuit low failures	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	-	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	B
							basic enable conditions met:	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
HO2S Heater Control Circuit Bank 1 Sensor 1 Circuit High	P0032	Monitoring the HO2S heater control circuit for circuit high failures	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	HO2S heater control commanded on	=	TRUE		fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	B
							Ignition on	=	TRUE	-		
							basic enable conditions met:	=	TRUE	-		
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	<	70.00	%	and					
			or				injection quantity	<=	24	mm^3/rev		
			mean offset learned value at fully closed valve position	>	110.00	%	and					
							acceleration pedal sensor	<=	1.00	%		
							and					
							Engine Speed	>=	575.00	rpm		
							and					
							Engine Speed	<=	1075.00	rpm		
							and					
							Vehicle speed	>=	0.00	mph		
							and					
							Vehicle speed	<=	3.11	mph		
							and					
							Battery voltage	>=	11.00	V		
							and					
							engine coolant temperature	>=	59.96	°C		
							and					
							engine coolant temperature	<=	127.96	°C		
							and					
							Barometric pressure	>=	65.00	kPa		
							and					
							Barometric pressure	<=	105.00	kPa		
							and					
							time since start	>	10.08	sec		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Rich idle regeneration	=	inactive	-		
							and					
							Adaption is finished for this driving cycle	=	inactive	-		
							and					
							valve closed	=	TRUE	-		
							and					
							turbocharger offset adaption timer	>=	0.50	sec		
							and					
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
			Path 2:				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	
			time taken to learn the mean offset learned value at fully closed valve position	>	30.00	sec	and					
							injection quantity	<=	24	mm^3/rev		
							and					
							Value acceleration pedal sensor 1	<=	1.00	%		
							and					
							Engine Speed	>=	575.00	rpm		
							and					
							Engine Speed	<=	1075.00	rpm		
							and					
							Vehicle speed	>=	0.00	mph		
							and					
							Vehicle speed	<=	3.11	mph		
							and					
							Battery voltage	>=	11.00	V		
							and					
							engine coolant temperature	>=	59.96	°C		
							and					
							engine coolant temperature	<=	127.96	°C		
							and					
							Barometric pressure	>=	65.00	kPa		
							and					
							Barometric pressure	<=	105.00	kPa		
							and					
							time since start	>	10.08	sec		
							and					
							Rich idle regeneration	=	inactive	-		
							and					
							Adaption is finished for this driving cycle	=	inactive	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					valve closed and turbocharger offset adaption timer and No Pending or Confirmed DTCs: and basic enable conditions met:	= TRUE - >= 0.50 sec = see sheet inhibit tables - = see sheet enable tables -		
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 and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet enable tables -	fail conditions exists for 3.0 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 and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet enable tables -	fail conditions exists for 0.5 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	> 11.00 V	fail conditions exists for 3.0 s monitor runs with 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.
					for time and starter is active cranking and basic enable conditions met:	 > 3.00 sec = FALSE - = see sheet enable tables -	whenever enable conditions are met	
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 and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet enable tables -	fail conditions exists for 1.0 s monitor runs with 0.01 s rate whenever enable conditions are met	B
HO2S Heater Resistance Bank1 Sensor 1	P0053	A/F sensor heating control monitoring, which monitors the heater control of the A/F sensor. If the temperature of the A/F sensor, based on the measured sensor internal resistance, exceeds a threshold a fault is detected	Temperature of A/F sensor (based on sensor internal resistance)	> 823.96 °C	Engine is running (please see the definition) Decel fuel cut-off (DFCO) for time (duty cycle value during sensor heat-up for time or Temperature of A/F sensor (based on sensor internal resistance) and Status bit for valid A/F sensor inner Resistance (see parameter definition table))	= TRUE - = FALSE - >= 5.00 sec >= 90.25 % >= 19.50 sec > 804.96 °C = TRUE -	fault exists for more than 30 sec; monitor runs at 0.1 s when 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 bit for heater control disabled (False = heater control active, True = heater control not active)	=	FALSE	-		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		A/F sensor heating control monitoring, which monitors the heater control of the A/F sensor. If the temperature of the A/F sensor, based on the measured sensor internal resistance, is less than a threshold a fault is detected	Temperature of A/F sensor (based on sensor internal resistance)	<	805.96	°C	Engine is running (please see the definition)	=	TRUE	-	fault exists for more than 60 sec; monitor runs at 0.1 s when enable conditions are met	
							Decel fuel cut-off (DFCO)	=	FALSE	-		
							for time	>=	5.00	sec		
							(					
							duty cycle value during sensor heat-up	>=	90.25	%		
							for time	>=	19.50	sec		
							or					
							Temperature of A/F sensor (based on sensor internal resistance)	>	804.96	°C		
							and					
							Status bit for valid A/F sensor inner Resistance (see parameter definition table)	=	TRUE	-		
							)					
							Status bit for heater control disabled (False = heater control active, True = heater control not active)	=	FALSE	-		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
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	B
			same as				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			downstream CAC temperature	>	199.96	°C	basic enable conditions met: and NO Pending or Confirmed DTCs:	= =	see sheet enable tables see sheet inhibit tables	- -	continuously 0.1 s rate	
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 same as downstream CAC temperature	> <	4.94 -50.04	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
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 #63)	>	11000 to 80000	kPa	state machine rail pressure control equal to metering unit control mode and basic enable conditions met: and metering unit actuator test active and NO Pending or Confirmed DTCs:	= =	TRUE see sheet enable tables FALSE see sheet inhibit tables	- - - -	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			rail pressure deviation from setpoint calculated out of difference between desired and actual value (see Look-Up-Table #66)	>	11000 to 80000	kPa	(state machine rail pressure control equal to pressure control valve or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)) and basic enable conditions met: and	 = =	 TRUE TRUE see sheet enable tables	 - - -	fail conditions exists for 8 s monitor runs with 0.02 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.
							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 #64)	<	-80000 to -18000	kPa	current injection quantity	>	4.00	mm^3/rev	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							fuel temperature	>	-40.04	°C		
							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	-		
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 0.22 s monitor runs	A

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 ignition on and basic enable conditions met: NO Pending or Confirmed DTCs:	> 3.00 sec = TRUE - = see sheet enable tables - = see sheet inhibit tables -	with 0.01 s rate whenever enable conditions are met	
		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 for time and ignition on and basic enable conditions met: NO Pending or Confirmed DTCs:	> 11.00 V > 3.00 sec = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	
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 for time and ignition on and basic enable conditions met: NO Pending or Confirmed DTCs:	> 11.00 V > 3.00 sec = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.28 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.
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 0.22 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for					
							time	>	3.00	sec		
							and					
							ignition on	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Temperature Sensor 2 Circuit Low	P0097	Detects a low PWM frequency from the humidity temperature sensor, indicating an OOR low condition on the humidity temperature sensor circuit	Humidity Temperature sensor frequency (Intake air temperature sensor 2)	<	28.03	Hz	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	B
			same as				and					
			humidity temperature	<	-50.04	degC	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 low condition on the humidity sensor circuit.	Internal ECM PWM circuit low voltage	=	TRUE	-	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	
			and				and					
			ECM PWM circuit maximum period detected	=	TRUE	-	following conditions for time:	>	1.00	sec		
			or				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.
			Internal ECM PWM period not received	=	TRUE	-	battery voltage	<	655.34	V		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Intake Air Temperature Sensor 2 Circuit High	P0098	Detects a high PWM frequency from the humidity temperature sensor, indicating an OOR high condition on the humidity temperature sensor circuit	Humidity Temperature sensor frequency (Intake air temperature sensor 2)	>	353.76	Hz	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	B
			same as humidity temperature	>	129.96	degC	and 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.	Internal ECM PWM circuit high voltage	=	TRUE	-	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	
			and ECM PWM circuit maximum period detected	=	TRUE	-	and following conditions for time:	>	1.00	sec		
			or Internal ECM PWM period not received	=	TRUE	-	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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator 1 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 and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 0.3s monitor runs with 0.01 s rate whenever enable conditions are met	A
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 -	(engine speed or engine post drive/ afterun) and NO Pending or Confirmed DTCs: for time and basic enable conditions met:	= 0 rpm = TRUE - - = see sheet inhibit tables - > 7.00 sec = see sheet enable tables -	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	A
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	< 0.05 V > 249.96 °C	ignition on and basic enable conditions met: and	= TRUE - = see sheet enable tables -	fail conditions exists for 5 s test performed continuously 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.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	>	4.94	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
			same as				and					
			temperature of intake air temperature sensor 3	<	-50.04	°C	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	Humidity Sensor Duty Cycle	<	5.00	%	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	B
			same as				and					
			relative humidity	<	0.00	%	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 low condition on the humidity sensor circuit.	Internal ECM PWM circuit low voltage	=	TRUE	-	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	
			and				and					
			ECM PWM circuit maximum period detected	=	TRUE	-	following conditions for time:	>	1.00	sec		
			or				battery voltage	>	11.00	V		
			Internal ECM PWM period not received	=	TRUE	-	battery voltage	<	655.34	V		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
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	Humidity Sensor Duty Cycle	>	95.00	%	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	B
			same as				and					
			relative humidity	>	100.00	%	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.	Internal ECM PWM circuit high voltage	=	TRUE	-	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 3.0 s test performed continuously with 0.1 s rate	
			and				and					
			ECM PWM circuit maximum period detected	=	TRUE	-	following conditions for time:	>	1.00	sec		
			or				battery voltage	>	11.00	V		
			Internal ECM PWM period not received	=	TRUE	-	battery voltage	<	655.34	V		
							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.
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				no pending or confirmed DTCs	=	see sheet inhibit tables	-		
			accumulated over time	>	0.10	sec	and					
							basic enable conditions met:	=	see sheet enable tables	-		
Mass Air Flow (MAF) Sensor Performance	P0101	Detects skewed MAF sensor by comparing measured MAF to calculated expected MAF based on volumetric efficiency of the engine	**Path 1:**								fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			ratio of measured air flow / desired air flow	<	[(a) - (b)] * (c) * (d)		ambient pressure	>	74.80	kPa		
			where				and					
			(a) Engine load dependent MAP for calculating lower threshold (see Look-Up-Table #1)	=	0.8 to 0.85	-	engine coolant temperature	>=	69.96	°C		
			(b) Air temperature dependent correction factor curve	=	0	-	and					
			(c) Engine temperature based correction factor curve	=	1	-	engine coolant temperature	<=	125.96	°C		
			(d) Barometric pressure based correction factor curve	=	1	-	and					
							gradient of the charge-air temperature	>=	-2.00	°C/sec		
			or				and					
							gradient of the charge-air temperature	<=	2.00	°C/sec		
			Path 2:				and					
			ratio of measured air flow / desired air flow	>	(e) + (f)	-	(					
			where				Engine Running (please see the defintion)	=	TRUE	-		
			(e) Engine load dependent MAP for calculating higher threshold	=	1.20	-	for					
			(f) Air temperature dependent correction factor curve	=	0	-	time since start	>	90.00	sec		
							)					
							and					
							control value of the throttle valve	>=	-400.00	%		
							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	<=	5.00	%		
					and					
					setpoint value of Variable swirl actuator	>=	-400.00	%		
					and					
					setpoint value of Variable swirl actuator	<=	399.99	%		
					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					
					Air System Control is not disabled	=	TRUE	-		
					and					
					(					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
					and					
					actual valve position of exhaust-gas recirculation	>=	-400.00	%		
					and					
					actual valve position of exhaust-gas recirculation	<=	2.00	%		
					for					
					time	>	3.00	sec		
					)					
					and					
					injection quantity	>=	-20.00	mm^3/rev		
					and					
					injection quantity	<=	150.00	mm^3/rev		
					and					
					air pressure in the induction volume	>=	74.80	kPa		
					and					
					air pressure in the induction volume	<=	280.00	kPa		
					and					
					engine speed	>=	575	rpm		
					and					
					engine speed	<=	1200	rpm		
					and					
					intake air temperature	>=	-7.04	°C		
					and					
					intake air temperature	<=	79.96	°C		
					and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Mass or Volume Air Flow Sensor "A" Circuit Low	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)	>	833.35	µsec	ignition on	=	TRUE	-	fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met	B
			same as air mass flow	<	0	g/sec	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Mass or Volume Air Flow Sensor "A" Circuit High	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 5 s monitor runs 0.01 s rate whenever enable conditions are met	B
			or				and basic enable conditions met:	=	see sheet enable tables	-		
			signal period of air mass flow sensor (MAF)	<	71.40	µsec	and					
			same as				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			air mass flow	>	245.56	g/sec						
Manifold Absolute Pressure (MAP) Sensor Performance	P0106	Detects a skewed MAP or BARO sensor by comparing MAP readings to the BARO sensor	**Path 1:**				measured coolant engine downstream temperature	>	-3549.94	°C	fail conditions exists for 5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			(a) - (b)	<	-15.00	kPa	and					
							current injection quantity	<	654.00	mm^3/rev		
			or **Path 2:**				and actuator position of throttle valve	<=	327.67	%		
			(a) - (b)	>	15.00	kPa	and turbo charger (VNT) wiping is active	=	FALSE	-		
			where (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		

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 and ambient air temperature and basic enable conditions met: and NO Pending or Confirmed DTCs:	 < > = =	 3.11 -30.04 see sheet enable tables see sheet inhibit tables	 mph °C - -		
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:** (sensor voltage of manifold absolute pressure same as manifold absolute pressure and actuator position of throttle valve) or **Path 2:** (sensor voltage of manifold absolute pressure same as manifold absolute pressure and actuator position of throttle valve)	 < < <= < < >	 0.20 20.00 20.00 0.20 20.00 20.00	 V kPa % V kPa %	engine synchronization completed and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 5 s test performed continuously 0.01 s rate	B
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	> >	4.80 300.00	V kPa	NO Pending or Confirmed DTCs: and engine synchronization completed and basic enable conditions met:	= = =	see sheet inhibit tables TRUE see sheet enable tables	- - -	fail conditions exists for 5 s test performed continuously 0.01 s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Intake Air Temperature Sensor 1 Circuit Low Bank 1	P0112	Detects low voltage readings on the MAF IAT circuit, indicating an OOR low condition on the MAF IAT circuit (IAT #1)	MAF intake air temperature sensor voltage	<	0.16	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	B
			same as intake air temperature	>	129.96	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Intake Air Temperature Sensor 1 Circuit High Bank 1	P0113	Detects high voltage readings on the MAF IAT circuit, indicating an OOR high condition on the MAF IAT circuit (IAT#1)	MAF intake air temperature sensor voltage	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	B
			same as intake air temperature	<	-50.04	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage	P0117	Detects low voltage readings on the ECT circuit, indicating an OOR low condition on the ECT circuit	voltage of engine coolant temperature sensor	<	0.80	V	ignition on	=	TRUE	-	fail conditions exists for 2.0 s test performed continuously 0.2 s rate	B
			same as engine coolant temperature	>	133	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Engine Coolant Temperature (ECT) Sensor Circuit High Voltage	P0118	Detects high voltage readings on the ECT circuit, indicating an OOR high condition on the ECT circuit	voltage of engine coolant temperature sensor	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 2.0 s test performed	B
			same as				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			engine coolant temperature	<	-50.04	°C	basic enable conditions met:	=	see sheet enable tables	-	continuously 0.2 s rate	
Engine Coolant Temperature / Intake Air Temperature Correlation	P011B	Detects a biased ECT or IAT1 by comparing start-up temperatures between the two sensors.	**Path 1:**				minimum engine-off time	>=	28800.00	sec	once per drive cycle	B
			|(a) - (b)| (see Look-Up-Table #15) where	>	20 to 999	°C	and					
			(				ambient temperature	>	-60.04	°C		
			(a) captured engine coolant temperature at start	=	measured parameter	-	and					
			and				Engine Running (please see the definition)	=	TRUE	-		
			(b) captured intake air 1 temperature at start	=	measured parameter	-	for					
			)				time	>	0.00	sec		
							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	-		
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.	modeled coolant temperature (model derived from injection quantity, coolant temperature at start, and ambient temperature)	>=	87.96	°C	engine pre drive	=	FALSE	-	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	B
			and				and					
			measured engine coolant temperature	<	76.76	°C	time since start	<	1440.00	sec		
							and					
							measured engine coolant temperature	>=	-40.04	°C		
							and					
							captured value of coolant temperature during start	<=	57.96	°C		
							and					
							(					
							ambient temperature	>	-7.04	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							ambient temperature	<	59.96	°C		
							)					
							and					
							ambient temperature (used for high region determination)	>	-30.04	°C		
							and					
							engine idle time ratio	<	0.50	%		
							which is defined by (idle time divided by time since start)					
							where idle time is incremented when: (					
							accelerator pedal value	<=	10.00	%		
							and					
							vehicle speed	<=	9.94	mph		
							and					
							engine speed	<=	1000.00	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	-		
HO2S Bank 1 Sensor 1 circuit low	P0131	Monitoring the A/F sensor circuits for circuit low failures	AF sensor IP voltage (IP circuit = A/F sensor Input Pump Current line which is the measuring circuit of the O2 concentration) or	<	0.90	V	Ignition on	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
							A/F sensor pumping current control active for time (only for VM & UN circuits)	<=	3.00	sec		
			A/F sensor -> UN circuit voltage / Vvcc (UN Voltage = A/F sensor nernst cell voltage) (Vvcc = system supply voltage varies between -0.3v to 5.5v) or	<	0.35	% of V	or					
							Activation status of open load test at UN and VM	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			A/F sensor -> VM circuit voltage / Vvcc (VM Voltage = reference ground voltage (Vvcc = system supply voltage varies between -0.3v to 5.5v)	<	0.40	% of V	and					
							A/F sensor temperature (only for IP circuit))	>	649.96	°C		
							and					
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							and					
							A/F sensor heater control reset conditions	=	FALSE	-		
							(					
							duty cycle value during sensor heat-up	>=	90.25	%		
							for time	>=	19.50	sec		
							or					
							Temperature of A/F sensor (based on sensor internal resistance)	>	804.96	°C		
							and					
							Status bit for valid A/F sensor inner Resistance (see parameter definition table)	=	TRUE	-		
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Bank 1 Sensor 1 circuit high	P0132	Monitoring the A/F sensor circuits for circuit high failures	AF sensor IP voltage (IP circuit = A/F sensor Input Pump Current line which is the measuring circuit of the O2 concentration)	>	7.50	V	Ignition on	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			or				A/F sensor pumping current control active for time (only for VM & UN circuits)	<=	3.00	sec		
			A/F sensor -> UN circuit voltage / Vvcc (UN Voltage = A/F sensor nernst cell voltage) (Vvcc = system supply voltage varies between -0.3v to 5.5v)	>	0.80	%V	or					
			or				Activation status of open load test at UN and VM	=	TRUE	-		
			A/F sensor -> VM circuit voltage / Vvcc (VM Voltage = reference ground voltage (Vvcc = system supply voltage varies between -0.3v to 5.5v)	>	0.60	%V	and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							A/F sensor temperature (only for IP circuit))	>	649.96	°C		
							and					
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							and					
							A/F sensor heater control reset conditions	=	FALSE	-		
							(					
							duty cycle value during sensor heat-up	>=	90.25	%		
							for time	>=	19.50	sec		
							or					
							Temperature of A/F sensor (based on sensor internal resistance)	>	804.96	°C		
							and					
							Status bit for valid A/F sensor inner Resistance (see parameter definition table)	=	TRUE	-		
							)					
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0133	Response time of A/F sensor signal monitoring at transition from load to fuel cut-off mode	Time to reach 30 % of expected rise in O2 concentration	>	3	sec	**Status: Inactive to Check OpPoint**				fault exists for more than 2 fuel cut-off events; monitor runs at 0.1 s when enable conditions are met	B
			OR				Influence of InjSys_qTot (Total engine injection quantity) on lambda signal known	=	TRUE	-		
			Time to reach 60% expected rise from 30% expected rise in O2 concentration	>	1.8	sec	Status bit which indicates if A/F sensor raw value is valid for A/F sensor diagnostic modules	=	TRUE	-		
							Test not inhibited through the selected conditions in the Inhibit Conditions Table	=	TRUE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							Engine speed	>	1100.00	rpm		
							Injection quantity	>	20.00	mm^3/rev		
							Battery voltage	>	11.00	V		
							DPF regeneration is not active	=	TRUE	-		
							Calculated O2 (lambda) signal	<	0.10	-		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							Status: Check OpPoint to Wait for Overrun					
							Injection quantity deviation	<	6.00	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.
							for time	>=	1	sec		
							Injection quantity deviation (calculated for dynamic response rate monitoring)	>	-6.00	mm^3/rev/sec		
							and					
							Injection quantity deviation (calculated for dynamic response rate monitoring)	<	6.00	mm^3/rev/sec		
							for time	>	1.00	sec		
							Status: Wait_for_Overrun to Evaluate Edge					
							Injection quantity deviation calculated for dynamic response rate monitoring	<	-4.00	mm^3/rev/sec		
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	<=	-12.00	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 A/F sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							component of combusted fuel in the engine	>=	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 #40)	=	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		

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	-		
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	>=	12.00	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 A/F sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							component of combusted fuel in the engine	>=	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 #40)	=	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	-		

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 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	<	1.07	V	ignition on	=	TRUE	-	fail conditions exists for 5.0 s test performed continuously 0.2 s rate	B
			same as fuel temperature	>	119.96	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 1 Circuit High	P0183	Detects high voltage readings in the fuel pump temperature sensor 1 circuit, indicating an OOR high condition on the fuel pump temperature sensor 1 circuit	voltage of fuel temperature sensor 1	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 5.0 s test performed continuously 0.2 s rate	B
			same as fuel temperature	<	-50.04	°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	>=	1.21	factor	fuel pressure regulator 2 in closed loop control (please see the definition)	=	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	<=	0.79	factor	and adaptation for fuel pressure regulator 2 active	=	TRUE	-		
							means (counter for successful adaptation	>	0	counts		
							or counter for the successful calculation of the adaptation	>	10.00	counts		
							and (engine speed	>	0.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							engine speed	<	10000.00	rpm		
							)					
							and					
							vehicle speed	<=	203.65	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	-		
		Detects a biased sensor by determining the FRP sensor voltage to be in the correct range for atmospheric pressure at engine off and with sufficient pressure bleed-off time.	rail pressure sensor voltage	<	0.42	V	(				fail conditions exists for more than 0.30 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	
			or				engine post drive/ afterun	=	TRUE	-		
			rail pressure sensor voltage	>	0.61	V	and					
							fuel temperature	>	-40.04	°C		
							and					
							engine has already run in this driving cycle	=	TRUE	-		
							and					
							rail pressure is reduced	=	TRUE	-		
							means					
							commanded rail pressure	<	0.00	kPa		
							and					
							fuel pressure regulator 2 current	<=	1.70	Amps		
							and					
							time since engine off	>	15.04	sec		
							)					
							and					
							number of fault measurements during engine postdrive/ afterun	>	10.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Rail Pressure [FRP] Sensor Circuit High	P0193	Detects high voltage readings on the FRP circuit, indicating an OOR high condition on the FRP circuit	rail pressure sensor voltage	>	4.81	V	ignition on	=	TRUE	-	fail conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as rail pressure	>	220000.00	kPa	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 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as rail pressure	<	0	kPa	and basic enable conditions met:	=	see sheet enable tables	-		
							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	>=	-0.04	°C		
			(a) maximum injection energizing time		304.4	μsec	and					
			and with				fuel temperature	<=	79.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value		Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) offset of the maximum filtered energizing time	32.8	μsec	)					
			)			and					
			)								
			for			engine coolant temperature	>	59.96	°C		
			rail pressure point	80000.00	kPa	and					
						battery voltage	>	11.00	V		
						and					
						combustion chamber is not cooled off					
						means					
						time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
						and					
						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	-		
						for					
						time	>	0.00	sec		
						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	=	1170	rpm		
						and with					
						(c) gear specific maximum engine speed	=	2030	rpm		
						)					
						and					
						current gear (see Look-Up-Table #82)	=	0 to 1	gear		
						and					
						vehicle speed	>	0	mph		
						and					
						rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
						for time	>	0.20	sec		
						and					
						no gear change is occurred	=	TRUE	-		
						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 enable tables	-		
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. Detects a fault when the corrected energizing time exceeds the allowed limit.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 2	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time		304.4	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time		32.8	µsec	)					
			)				and					
			)									
			for				engine coolant temperature	>	59.96	°C		
			rail pressure point		80000.00	kPa	and					
							battery voltage	>	11.00	V		
							and					
							combustion chamber is not cooled off					
							means					
							time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
							and					
							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	-		
							for					
							time	>	0.00	sec		
							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	=	1170	rpm		
							and with					
							(c) gear specific maximum engine speed	=	2030	rpm		
							)					
							and					
							current gear (see Look-Up-Table #82)	=	0 to 1	gear		
							and					
							vehicle speed	>	0	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
							for time	>	0.20	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable 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 3	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time		304.4	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time		32.8	µsec	)					
			)				and					
			)									
			for				engine coolant temperature	>	59.96	°C		
			rail pressure point		80000.00	kPa	and					
							battery voltage	>	11.00	V		
							and					
							combustion chamber is not cooled off means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
					and					
					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	-		
					for					
					time	>	0.00	sec		
					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	=	1170	rpm		
					and with					
					(c) gear specific maximum engine speed	=	2030	rpm		
					)					
					and					
					current gear (see Look-Up-Table #82)	=	0 to 1	gear		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
					for time	>	0.20	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	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 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 4	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time		304.4	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time		32.8	µsec	)					
			)				and					
			)									
			for				engine coolant temperature	>	59.96	°C		
			rail pressure point		80000.00	kPa	and					
							battery voltage	>	11.00	V		
							and					
							combustion chamber is not cooled off					
							means					
							time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
							and					
							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	-		
							for					
							time	>	0.00	sec		
							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	=	1170	rpm		
							and with					
							(c) gear specific maximum engine speed	=	2030	rpm		
							)					

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 #82)	=	0 to 1	gear		
							and					
							vehicle speed	>	0	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
							for time	>	0.20	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable 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	>=	-0.04	°C		
			(a) minimum injection energizing time		107.2	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time		47.2	µsec	)					
			)				and					
			)									
			for				engine coolant temperature	>	59.96	°C		
			rail pressure point		80000.00	kPa	and					
							battery voltage	>	11.00	V		
							and					
							combustion chamber is not cooled off means					
							time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
							and					
							and					
							intake manifold pressure	>	75.00	kPa		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					intake manifold pressure	<	150.00	kPa		
					and					
					accelerator pedal position	<	0.05	%		
					and					
					Fuel system status	=	Fuel cut off	-		
					for					
					time	>	0.00	sec		
					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	=	1170	rpm		
					and with					
					(c) gear specific maximum engine speed	=	2030	rpm		
					)					
					and					
					current gear (see Look-Up-Table #82)	=	0 to 1	gear		
					and					
					vehicle speed	>	0	mph		
					and					
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
					for time	>	0.20	sec		
					and					
					no gear change is occurred	=	TRUE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet enable 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	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 2	<	(a) + (b)	-	and				whenever enable conditions are met	
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) minimum injection energizing time		107.2	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time		47.2	µsec	)					
			)				and					
			)									
			for				engine coolant temperature	>	59.96	°C		
			rail pressure point		80000.00	kPa	and					
							battery voltage	>	11.00	V		
							and					
							combustion chamber is not cooled off					
							means					
							time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
							and					
							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	-		
							for					
							time	>	0.00	sec		
							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	=	1170	rpm		
							and with					
							(c) gear specific maximum engine speed	=	2030	rpm		
							)					
							and					
							current gear (see Look-Up-Table #82)	=	0 to 1	gear		
							and					
							vehicle speed	>	0	mph		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
							for time	>	0.20	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable 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 3	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) minimum injection energizing time		107.2	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time		47.2	µsec	)					
			)				and					
			)									
			for				engine coolant temperature	>	59.96	°C		
			rail pressure point		80000.00	kPa	and					
							battery voltage	>	11.00	V		
							and					
							combustion chamber is not cooled off means					
							time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
							and					
							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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>	0.00	sec		
							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	=	1170	rpm		
							and with					
							(c) gear specific maximum engine speed	=	2030	rpm		
							)					
							and					
							current gear (see Look-Up-Table #82)	=	0 to 1	gear		
							and					
							vehicle speed	>	0	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
							for time	>	0.20	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable 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 4	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) minimum injection energizing time		107.2	μsec	and					
			and with				fuel temperature	<=	79.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(b) offset of the minimum filtered energizing time	47.2 µsec	)			
			)		and			
			)					
			for		engine coolant temperature	> 59.96 °C		
			rail pressure point	80000.00 kPa	and			
					battery voltage	> 11.00 V		
					and			
					combustion chamber is not cooled off			
					means			
					time since last combustion (see Look-Up-Table #83)	>= 7 to 20 sec		
					and			
					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 -		
					for			
					time	> 0.00 sec		
					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	= 1170 rpm		
					and with			
					(c) gear specific maximum engine speed	= 2030 rpm		
					)			
					and			
					current gear (see Look-Up-Table #82)	= 0 to 1 gear		
					and			
					vehicle speed	> 0 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 2500.00 kPa		
					for time	> 0.20 sec		
					and			
					no gear change is occurred	= TRUE -		
					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 enable 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	<	69.96	°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	counts	and					
			which is equivalent to fault time	>=	80.00	sec	ambient temperature	>=	-7.04	°C		
							and					
							engine coolant temperature at least once in a drive cycle	>=	69.96	°C		
							and					
							instantaneous fuel consumption (low-pass filtered)	>=	2.00	l/h		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 #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	A

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	
Injector 3 Control Circuit	P0203	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	A
Injector 4 Control Circuit	P0204	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	A
Turbochager Overboost	P0234	Detects an permanent negative control deviation of the boost pressure	control deviation of the boost pressure calculated out of difference between desired and actual value with	<	(d) * (e) * (f)	-	following conditions for time	>	0.50	sec	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions	B
							(	=	FALSE	-		
			(d) The lower threshold pressure (see Look-Up-Table #58)	=	-40 to -10	kPa	VNT turbo charger offset adaptation active	=	FALSE	-		
			(e) correction factor	=	1.00	-	and					
			(f) ECB valve based lower limit correction factor	=	1.00	-	turbo charger (VNT) wiping is 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.
							absolute filtered gradient of boost pressure setpoint, PCR_pDesVal , calculated over a time dT constitutes the third condition for detecting the steady state	<	7.50	kPa	are met	
							and					
							injection Quantity	>=	100.00	mm^3/rev		
							injection Quantity	<=	150.00	mm^3/rev		
							and					
							engine Speed	>=	2000.00	rpm		
							engine Speed	<=	3500.00	rpm		
							and					
							turbocharger control deviation	>=	-10.00	%		
							turbocharger control deviation	<=	10.00	%		
							and					
							commanded turbocharger position	<	75.00	%		
							and					
							particulate filter regeneration	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 1 Balance System	P0263	Detects if the amount of fuel injection compensation is at the control limit as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current injection quantity	>	6.00	mm^3/rev		
			with				current injection quantity	<	190.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #37)	=	-24 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	<	4000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #38)	=	0 to 24	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 2 Balance System	P0266	Detects if the amount of fuel injection compensation is at the control limit as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or fuel balance correction quantity	>	(c) * (b)	-	and current injection quantity	>	6.00	mm^3/rev		
			with				current injection quantity	<	190.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #37)	=	-24 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	<	4000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #38)	=	0 to 24	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Balance System	P0269	Detects if the amount of fuel injection compensation is at the control limit as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or fuel balance correction quantity	>	(c) * (b)	-	and current injection quantity	>	6.00	mm^3/rev		
			with				current injection quantity	<	190.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #37)	=	-24 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	<	4000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #38)	=	0 to 24	mm^3/rev	and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Balance System	P0272	Detects if the amount of fuel injection compensation is at the control limit as determined by Fuel Balance Control (FBC)	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or fuel balance correction quantity	>	(c) * (b)	-	and current injection quantity	>	6.00	mm^3/rev		
			with				current injection quantity	<	190.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #37)	=	-24 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	<	4000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #38)	=	0 to 24	mm^3/rev	and					
							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 from the temperature upstream of the charge air cooler, temperature downstream of the charge air cooler, and modeled ambient air temperature	filtered charge-air cooler efficiency	<	0.40	factor	vehicle speed	>=	31.08	mph	fail conditions exists for 90 s monitor runs once per driving cycle with 0.1 s rate whenever enable conditions are met	B
							and air mass flow	>=	27.78	g/sec		
							air mass flow (see Look-Up-Table #14)	<=	55.56 to 277.8	g/sec		
							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.
							engine coolant temperature	<=	125.96	°C		
							and					
							boost pressure ratio	>=	1.22	ratio		
							(maximum value of (a) and (b))					
							the maximum value is then divided by (b)					
							with					
							(a) boost pressure downstream compressor	=	calculated 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					
							diagnostic performed in current Drive Cycle	=	FALSE	-		
							and					
							(a) - (b)	>=	40.00	°C		
							with					
							(a) upstream charge air cooler temperature	=	measured parameter	-		
							and with					
							(b) ambient air temperature	=	measured parameter	-		
							and					
							injection quantity	>=	20.00	mm^3/rev		
							injection quantity	<=	140.00	mm^3/rev		
							and					
							ambient pressure	>	74.80	kPa		
							and					
							ambient temperature	>	-7.04	°C		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	<=	-7.00	mm^3/rev	(Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions	B
							means					
							(					
							lambda signal from A/F sensor ready (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.
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-	are met	
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							component of combusted fuel in the engine	>=	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 #) (see Look-Up-Table #40)	=	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		
							Vehicle speed	<	1.86	mph		
							and					
							(					
							Engine speed	>=	575	rpm		
							Engine speed	<=	1075	rpm		
							)					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
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 #39)	>=	-0.6 to 2	mm^3/hub	(Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							means					
							(					
							lambda signal from A/F sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							((					
							component of combusted fuel in the engine	>=	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 #) (see Look-Up-Table #40)	=	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		
							Vehicle speed	<	1.86	mph		
							and					
							(					
							Engine speed	>=	575	rpm		
							Engine speed	<=	1075	rpm		
							)					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Turbochager Underboost	P0299	Detects an permanent positive control deviation of the boost pressure	control deviation of the boost pressure calculated out of difference between desired and actual value	>	(a) * (b) * (c)		following conditions for time	>	0.50	sec	fail conditions exists for 7.5 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with				(	=	FALSE	-		
			(a) the upper limit (see Look-Up-Table #57)	=	20 to 55	kPa	VNT turbo charger offset adaptation active	=	FALSE	-		
			(b) Correction factor	=	1.00	factor	and					
			(c) ECB valve based upper limit correction factor	=	1.00	factor	turbo charger (VNT) wiping is 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.
							absolute filtered gradient of boost pressure setpoint calculated over a time dT constitutes the third condition for detecting the steady state	<	7.50	kPa		
							and					
							injection Quantity	>=	60.00	mm^3/rev		
							injection Quantity	<=	150.00	mm^3/rev		
							and					
							engine Speed	>=	1500.00	rpm		
							engine Speed	<=	3500.00	rpm		
							and					
							particulate filter regeneration	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 1 Injection Timing Reached Feedback Limit	P02CD	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 1	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)		0 to 547.2	μsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #22)		0 to 16	μsec	)					
			)				and					
			)									
			OR				engine coolant temperature	>	59.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	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.
			(			and					
			with			combustion chamber is not cooled off					
			(a) minimum injection energizing time (see Look-Up-Table #21)	0 to 137.2	µsec	means					
			and with			time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #23)	0 to 16	µsec	and					
			)			and					
			)			intake manifold pressure	>	75.00	kPa		
			for			and					
			rail pressure point (see Look-Up-Table #19)	0 to 80000	kPa	intake manifold pressure	<	150.00	kPa		
						and					
						accelerator pedal position	<	0.05	%		
						and					
						Fuel system status	=	Fuel cut off	-		
						for					
						time	>	0.00	sec		
						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	=	1170	rpm		
						and with					
						(c) gear specific maximum engine speed	=	2030	rpm		
						)					
						and					
						current gear (see Look-Up-Table #82)	=	0 to 1	gear		
						and					
						vehicle speed	>	0	mph		
						and					
						rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
						for time	>	0.20	sec		
						and					
						no gear change is occurred	=	TRUE	-		
						and					
						basic enable conditions met:	=	see sheet enable tables	-		
						and					
						NO Pending or Confirmed DTCs:	=	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 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 1	>	(a) - (b)	-	and					
			(with				(fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)		0 to 547.2	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #22)		0 to 16	µsec	)					
			)				and					
			) OR				engine coolant temperature	>	59.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	battery voltage	>	11.00	V		
			(with				and combustion chamber is not cooled off					
			(a) minimum injection energizing time (see Look-Up-Table #21)		0 to 137.2	µsec	means					
			and with				time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #23)		0 to 16	µsec	and					
			))				and intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)		0 to 80000	kPa	intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position	<	0.05	%		
							and Fuel system status	=	Fuel cut off	-		
							for time	>	0.00	sec		
							and (engine speed	>	(b) - (a)	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	1170	rpm		
							and with					
							(c) gear specific maximum engine speed	=	2030	rpm		
							)					
							and					
							current gear (see Look-Up-Table #82)	=	0 to 1	gear		
							and					
							vehicle speed	>	0	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
							for time	>	0.20	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable 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 1	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)		0 to 547.2	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #22)		0 to 16	µsec	)					
			)				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			)									
			OR				engine coolant temperature	>	59.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	battery voltage	>	11.00	V		
			(				and					
			with				combustion chamber is not cooled off					
			(a) minimum injection energizing time (see Look-Up-Table #21)		0 to 137.2	µsec	means					
			and with				time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #23)		0 to 16	µsec	and					
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)		0 to 80000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							for					
							time	>	0.00	sec		
							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	=	1170	rpm		
							and with					
							(c) gear specific maximum engine speed	=	2030	rpm		
							)					
							and					
							current gear (see Look-Up-Table #82)	=	0 to 1	gear		
							and					
							vehicle speed	>	0	mph		
							and					
							rail pressure deviation from setpoint calculated out of difference between desired and actual value	<	2500.00	kPa		
							for time	>	0.20	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable 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. Detects a fault when the corrected energizing time exceeds the feedback control limit.	(				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
			corrected energizing time for the rail pressure calibration points and cylinder 1	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	-0.04	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)		0 to 547.2	µsec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #22)		0 to 16	µsec	)					
			)				and					
			)									
			OR				engine coolant temperature	>	59.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	battery voltage	>	11.00	V		
			(				and					
			with				combustion chamber is not cooled off means					
			(a) minimum injection energizing time (see Look-Up-Table #21)		0 to 137.2	µsec						
			and with				time since last combustion (see Look-Up-Table #83)	>=	7 to 20	sec		
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #23)		0 to 16	µsec	and					
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)		0 to 80000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel system status	= Fuel cut off -		
					for			
					time	> 0.00 sec		
					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	= 1170 rpm		
					and with			
					(c) gear specific maximum engine speed	= 2030 rpm		
					)			
					and			
					current gear (see Look-Up-Table #82)	= 0 to 1 gear		
					and			
					vehicle speed	> 0 mph		
					and			
					rail pressure deviation from setpoint calculated out of difference between desired and actual value	< 2500.00 kPa		
					for time	> 0.20 sec		
					and			
					no gear change is occurred	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet enable 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	> 11.00 V	fail conditions exists for 1,1s 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			
					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.
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					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.		battery voltage	>	11.00	V	fail conditions exists for 0,5 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					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					Open Load Diagnosis active	=	FALSE	-		
					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.		battery voltage	>	11.00	V	fail conditions exists for 0,5 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					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					Open Load Diagnosis active	=	FALSE	-		
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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 0,5 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 basic enable conditions met:	=	see sheet enable tables	-		
							and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and Open Load Diagnosis active	=	FALSE	-		
							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 0,5 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 basic enable conditions met:	=	see sheet enable tables	-		
							and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and Open Load Diagnosis active	=	FALSE	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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 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	-		
							and Throttle Governor is active	=	TRUE	-		
							and Throttle Valve Permanent Control Deviation	=	FALSE	-		
							and throttle valve is detected as frozen means	=	TRUE	-		
							Engine Coolant Temperature	<	198.96	°C		
							and engine speed (see Look-Up-Table #81)	>	850 to 1100	rpm		
							and (Offset learning done on previous driving cycle	=	TRUE	-		
							OR Offset learning on going)	=	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 voltage	<	0.41	V	ignition on	=	TRUE	-	fail conditions exists for 5.0 s; test performed continuously 0.005 s rate	B
			same as throttle position	<	-10	%	and basic enable conditions met	=	see sheet enable tables	-		
							and No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Diesel Intake Air Flow Position Sensor Circuit High Voltage	P02E9	Detects high voltage readings on the throttle valve position sensor circuit, indicating an OOR high condition on the throttle valve position sensor circuit	measured throttle valve position voltage	>	4.61	mV	ignition on	=	TRUE	-	fail conditions exists for 5.0 s; test performed continuously 0.005 s rate	B
			same as				and					
			throttle position	>	105	%	basic enable conditions met	=	see sheet enable tables	-		
							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 2.0 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					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and					
							Open Load Diagnosis active	=	FALSE	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
Engine Misfire Detected	P0300	Indicates that the engine has experienced more than one cylinder misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	angular acceleration of the crankshaft (see Look-Up-Table #52)	<	-12 to -2.5	sec^(2)	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			number of detected misfires	>=	200.00	counts	and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			for				engine speed	>	400.00	rpm	are met	
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	<	1300.00	rpm		
			(a) number of crankshaft revolutions per block	=	20.00	counts	)					
			and with				and					
			(b) number of test blocks	=	45.00	counts	|(a) - (b)|	<	250.00	rpm		
			and				with					
			misfires exist on more than one cylinder	=	TRUE	-	(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	6.00	mm^3/rev		
							and					
							current injection quantity	<	75.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	40.06	°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					
							current change in engine speed	<=	250.00	rpm		
							for					
							time	=	0.00	sec		
							and					
							current change in injection quantity	<=	60.00	mm^3/rev		
							for					
							time	=	0.00	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.
Cylinder 1 Misfire Detected	P0301	Indicates that the engine has experienced a single cylinder misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	angular acceleration of the crankshaft (see Look-Up-Table #52)	<	-12 to -2.5	sec^(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	-		
			number of detected misfires	>=	200.00	counts	and					
			for				engine speed	>	400.00	rpm		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	<	1300.00	rpm		
			(a) number of crankshaft revolutions per block	=	20.00	counts	)					
			and with				and					
			(b) number of test blocks	=	45.00	counts	|(a) - (b)|	<	250.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	6.00	mm^3/rev		
							and					
							current injection quantity	<	75.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	40.06	°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					
							current change in engine speed	<=	250.00	rpm		
							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					
							current change in injection quantity	<=	60.00	mm^3/rev		
							for					
							time	=	0.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Misfire Detected	P0303	Indicates that the engine has experienced a single cylinder misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	angular acceleration of the crankshaft (see Look-Up-Table #52)	<	-12 to -2.5	sec^(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	-		
			number of detected misfires	>=	200.00	counts	and					
			for				engine speed	>	400.00	rpm		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	<	1300.00	rpm		
			(a) number of crankshaft revolutions per block	=	20.00	counts	)					
			and with				and					
			(b) number of test blocks	=	45.00	counts	|(a) - (b)|	<	250.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	6.00	mm^3/rev		
							and					
							current injection quantity	<	75.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	40.06	°C		
							and					
							vehicle speed	<=	1.86	mph		
							and					
							time since start	>=	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.
							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					
							current change in engine speed	<=	250.00	rpm		
							for					
							time	=	0.00	sec		
							and					
							current change in injection quantity	<=	60.00	mm^3/rev		
							for					
							time	=	0.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Misfire Detected	P0304	Indicates that the engine has experienced a single cylinder misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	angular acceleration of the crankshaft (see Look-Up-Table #52)	<	-12 to -2.5	sec^(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	-		
			number of detected misfires	>=	200.00	counts	and					
			for				engine speed	>	400.00	rpm		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	<	1300.00	rpm		
			(a) number of crankshaft revolutions per block	=	20.00	counts	)					
			and with				and					
			(b) number of test blocks	=	45.00	counts	|(a) - (b)|	<	250.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							current injection quantity	>	6.00	mm^3/rev		
							and					
							current injection quantity	<	75.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	40.06	°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					
							current change in engine speed	<=	250.00	rpm		
							for					
							time	=	0.00	sec		
							and					
							current change in injection quantity	<=	60.00	mm^3/rev		
							for					
							time	=	0.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 2 Misfire Detected	P0302	Indicates that the engine has experienced a single cylinder misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	angular acceleration of the crankshaft (see Look-Up-Table #52)	<	-12 to -2.5	sec^(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	-		
			number of detected misfires	>=	200.00	counts	and					
			for				engine speed	>	400.00	rpm		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	<	1300.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(a) number of crankshaft revolutions per block	= 20.00 counts	)			
			and with (b) number of test blocks	= 45.00 counts	and |(a) - (b)|	< 250.00 rpm		
					with (a) actual desired idle speed	= calculated parameter -		
					and with (b) engine speed	= measured parameter -		
					and (current injection quantity	> 6.00 mm^3/rev		
					and current injection quantity	< 75.00 mm^3/rev		
					) and engine coolant temperature	>= 40.06 °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 current change in engine speed	<= 250.00 rpm		
					for time	= 0.00 sec		
					and current change in injection quantity	<= 60.00 mm^3/rev		
					for time	= 0.00 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.
Crankshaft Position System Variation Not Learned	P0315	Wheel Learn - Fuel Balance System - Tooth Wheel Variation and Crankshaft Dynamics not learned quickly enough	fuel balance wheel learn complete	=	FALSE	-	fuel system is in fuel cut off	=	TRUE	-	fail conditions exists for 5000 s cumulative time monitor runs with 1 s rate whenever enable conditions are met	B
							and					
							engine speed	>	1000	rpm		
							engine speed	<	3500	rpm		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Crankshaft Position [CKP] Sensor Circuit	P0335	Detects crankshaft sensor circuit failure by monitoring for valid signals from CKP sensor while CMP sensor is also sending valid signals	ECM has detected reference mark on the crankshaft	=	FALSE	-	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				and					
			number of none detected crankshaft rotations	>=	6.00	counts	Engine backward rotation detected	=	FALSE	-		
							and					
							(					
							(					
							engine speed	>=	550.00	rpm		
							and					
							synchronization completed	=	TRUE	-		
							)					
							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	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Crankshaft Position Sensor Performance	P0336	Detects implausible crankshaft sensor operation by detecting incorrect crank sensor signal patterns.	number of disturbances in crankshaft signal	>=	3.00	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	µsec	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						
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	>=	2.50	counts	NO pending or confirmed DTCs	=	see sheet inhibit tables	-	fail conditions exists for more than 3 events test performed continuously 0.01 s rate	B
							and					
							ECM has detected reference mark on the crankshaft	=	TRUE	-		
							and					
							Ignition ON	=	TRUE	-		
							and					
							engine synchronization operation is not finished	=	TRUE	-		
							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	>	6.00	counts	NO pending or confirmed DTCs	=	see sheet inhibit tables	-	fail conditions exists for more than 6 events test performed continuously	B
							and					
							ECM has detected reference mark on the crankshaft	=	TRUE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Ignition ON and engine synchronization operation is not finished and basic enable conditions met:	= = =	TRUE TRUE see sheet enable tables	- - -	0.01 s rate	
Glow Plug/Heater Indicator Control Circuit Low	P037A	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 and battery voltage for time and basic enable conditions met:	= > > =	TRUE 11.00 3.00 see sheet enable tables	- V sec -	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
Glow Plug/Heater Indicator Control Circuit High	P037B	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 on and battery voltage for time and basic enable conditions met:	= > > =	FALSE 11.00 3.00 see sheet enable tables	- V sec -	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	B
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	B

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	
					battery voltage	> 11.00 V		
					for			
					time	> 3.00 sec		
					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 #11)	= -0.15 to -0.04 g/rev	and			
			(b) Environmental Pressure correction factor (see Look-Up-Table #8)	= 0.75 to 1 factor	The maximum possible air-mass flow > The air-mass setpoint	= TRUE -		
					and			
					change of injection quantity between actual and last received value	< 25.00 (mm^3/rev)/sec		
					for time	= 0.25 sec		
					and			
					change of engine speed between actual and last received value	< 150.00 rpm/sec		
					for time	= 0.50 sec		
					and			
					VGT offset learning is active	= FALSE -		
					maximum setpoint for EGR mass flow (see Look-Up-Table #9)	> 0.40 to 0.1 g/rev		
					and			
					Engine speed	>= 1200.00 rpm		
					Engine speed	<= 3000.00 rpm		
					and			
					Torque generating engine fuel injection quantity	>= 2.00 mm^3/rev		
					Torque generating engine fuel injection quantity	<= 40.00 mm^3/rev		
					and			
					setpoint valve position of exhaust-gas recirculation	> 2.00 %		
					and			
					throttle position	< 5.00 %		
					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	-		
							)					
							for time	>=	0.50	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 5 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)	=	0.033 to 0.075	g/rev	and					
			(b) Environmental Pressure correction factor	=	1	factor	The maximum possible air-mass flow > The air-mass setpoint	=	TRUE	-		
							and					
							change of injection quantity between actual and last received value	<	25.00	(mm^3/rev)/sec		
							for time	=	0.25	sec		
							and					
							change of engine speed between actual and last received value	<	150.00	rpm/sec		
							for time	=	0.50	sec		
							and					
							VGT offset learning is active	=	FALSE	-		
							and					
							maximum setpoint for EGR mass flow	<=	0.10	g/rev		
							and					
							maximum setpoint for EGR mass flow	>=	-0.03	g/rev		
							and					
							Engine speed	<=	3000.00	rpm		
							Engine speed	>=	1200.00	rpm		
							and					
							Torque generating engine fuel injection quantity	<=	120.00	mm^3/rev		
							Torque generating engine fuel injection quantity	>=	40.00	mm^3/rev		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>=	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.
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 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 7 s 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.		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	

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 Low Voltage	P0405	Detects low voltage readings on the EGR position sensor circuit, indicating an OOR low condition on the EGR position sensor circuit	voltage of EGR position sensor	<	0.25	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	B
			same as EGR actuator position	<	-25	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation(EGR) Position Sensor Circuit High Voltage	P0406	Detects high voltage readings on the EGR position sensor circuit, indicating an OOR high condition on the EGR position sensor circuit	voltage of EGR position sensor	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	B
			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	<	0.14	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	>	1000	°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					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							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	>	4.98	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	<	-45	°C	ambient temperature	>	-10.04	°C		
							or					
							time since engine start	>	100.00	sec		
							)					
							and					
							engine coolant 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					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(valve position of EGR cooler bypass and valve position of EGR cooler bypass)) and basic enable conditions met: and NO Pending or Confirmed DTCs:	> -100.00 % < 200.00 % = see sheet enable tables - = see sheet inhibit tables -		
Exhaust Gas Recirculation(EGR) Temperature Sensor Correlation (EGR 1/ EGR 2)	P040F	Detects biased EGR temperature sensors by comparing the two EGR cooler temp sensor after an engine off soak time	**Path 1:** |(a) - (b)| (see Look-Up-Table #4) with (a) captured EGR sensor 2 temperature at start and with (b) captured EGR sensor 1 temperature at start or	> 20 to 3276.7 °C = measured parameter - = measured parameter -	minimum engine-off time and ambient temperature and Engine Running (see parameter definition) 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 > -7.04 °C = TRUE - > 0.10 sec = FALSE = FALSE = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
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 same as	< 0.13 V	(time since engine start	> 0.00 sec	fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			EGR sensor 1 temperature	>	1000	°C	and				are met	
							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 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	>	4.98	mV	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				(					
			EGR sensor 1 temperature	<	-45	°C	time since engine start	>	4.96	sec		
							or					
							ambient temperature	>	-10.04	°C		
							)					
							and					
							engine coolant temperature	>	-60.04	°C		
							ambient pressure	>	20.00	kPa		
							and					
							(					
							setpoint valve position of exhaust-gas recirculation	>	-100.00	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	> 0.01 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	< 0.25 -	Stage 2 Rapid Heat-up Injection Mode	= TRUE -	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
					Rapid Heat-up is a catalyst heating strategy. Stage 2 refers to stage of Rapid-Heat-Up where both PoI1 and PoI2 are injected which results in exotherm across DOC			
					and			
					monitor already enabled this drive cycle (i.e. once per trip)	= FALSE -		
					and			
					(			
					engine speed	> 0.00 rpm		
					and			
					engine speed	<= 6000.00 rpm		
					)			
					and			
					absolute value of modeled temperature downstream of DOC minus modeled temperature without heat of exotherm downstream of DOC	> 2.00 °C		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(					
							Coolant temperature at engine start	>	-7.04	°C		
							and					
							Coolant temperature at engine start	<=	35.96	°C		
							)					
							and					
							time with DOC monitor released	<	200	sec		
							and					
							integrated modeled combusted fuel mass flow into DOC	>	4.50	g		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel Level Sensor "A" Circuit Range/Performance	P0461	Detects an error in the fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	>=	149.13	miles	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				for					
			(a) total vehicle distance	=	measured parameter	-	time	>	60.00	sec		
			and with				and					
			(b) saved value of total vehicle distance at start of test	=	measured parameter	-	fuel volume in tank	<	100.00	%		
							and					
			and				basic enable conditions met:		see sheet enable tables	-		
			(c) - (d)	<	3.00	L	and					
			with				NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		
			(c) maximum volume of fuel reached in tank during test	=	measured parameter	-						
			and with									
			(d) minimum volume of fuel reached in tank during test	=	measured parameter	-						
Fuel Level Sensor 1 Circuit Low	P0462	Detects low voltage readings on the fuel level sensor circuit, indicating an OOR low condition on the circuit	voltage of fuel level sensor 1	<	0.48	V	ignition on	=	TRUE	-	fail conditions exists for 8 s test performed continuously	B
			same as				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			fuel level	>	59.05	L	basic enable conditions met:	=	see sheet enable tables	-	0.01 s rate	
Fuel Level Sensor 1 Circuit High	P0463	Detects high voltage readings on the fuel level sensor circuit, indicating an OOR high condition on the circuit	voltage of fuel level sensor 1	>	2.80	V	ignition on	=	TRUE	-	fail conditions exists for 8 s test performed continuously 0.01 s rate	B
			same as				and					
			fuel level	<	0.00	L	basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Position Sensor Performance	P046C	Detects in range EGR valve position errors by comparing desired EGR position to actual EGR valve position	controller deviation of EGR valve calculated out of difference between desired and actual value	>=	5.00	%	offset learning of EGR actuator active	=	FALSE	-	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			or				and					
			controller deviation of EGR valve calculated out of difference between desired and actual value	<=	-5.00	%	offset learning in the previous driving cycle was complete	=	TRUE	-		
							and					
							Engine is in the normal state	=	TRUE	-		
							and					
							duty cycle of the Intake Air Heater output	<	327.67	%		
							and					
							battery voltage	>=	11.00	V		
							and					
							The position control is active	=	FALSE	-		
							and					
							EGR Valve Jammed	=	FALSE	-		
							and					
							EGR Valve Jammed	=	TRUE	-		
							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.
Fan 1 Control Circuit	P0480	Diagnoses the Cooling Fan 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 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	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	=	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 ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							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) 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	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							and battery voltage for	>	11.00	V		
							time	>	3.00	sec		
							and starter is active cranking for	=	FALSE	-		
							time	>	3.00	sec		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation (EGR) Control Position Not Learned	P049D	Detects adaptation values of EGR valve are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	**Path 1:**				offset learning finished	=	FALSE	-	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	B
			the difference between the maximum value of the read position (a) and the minimum value of the read position (b) with	>	5.00	%	and					
			(a) maximum learned offset value for EGR valve	=	measured parameter	-	(engine coolant temperature	>=	84.96	°C		
			and with (b) minimum learned offset value for EGR valve	=	measured parameter	-	and engine coolant temperature	<=	127.96	°C		
			or **Path 2:** (				) and (					
			learned offset value for EGR valve in the present driving cycle	>	10.00	%	battery voltage	>=	11.00	V		
			or learned offset value for EGR valve in the present driving cycle	<	-10.00	%	and battery voltage	<=	655.34	V		
			)				) and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							EGR sweep has ended - no movement in EGR valve	=	TRUE	-		
							and					
							engine post drive/ afterun	=	TRUE	-		
							and					
							engine was running during last driving cycle	=	TRUE	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables			
		Detects a jammed EGR valve during opening or closing the valve.	**Path 1:**							-	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	
							offset learning active	=	TRUE			
			EGR valve stuck during opening	=	TRUE		and					
			means				engine post drive/ afterun	=	TRUE	-		
			(				and					
			(				(					
			(a) + (b)	>=	20.00	%	**Path 1:**					
			with				EGR valve is opening	=	TRUE	-		
			(a) position of EGR valve	=	measured parameter	-	or					
			and with				**Path 2:**					
			(b) learned offset value of EGR valve in the previous driving cycle	=	calculated parameter	-	EGR valve is closing	=	TRUE	-		
			)				)					
			and									
			(									
			(a) - (c)	<=	0.01	%						
			with									
			(a) position of EGR valve	=	measured parameter	-						
			and with									
			(c) position of EGR valve of previous process cycle	=	calculated parameter	-						
			)									
			)									
			for									
			time	>	5.00	sec						
			or									
			Path 2:									
			EGR valve stuck during closing	=	TRUE							
			means									
			(									
			(		110.00	%						
			(a) * (b)	>								
			with									
			(a) reference position of the EGR valve in open position	=	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) factor for EGR valve close position	= 0.20 factor				
			)					
			and					
			(					
			|(c) - (d)|	<= 100.00 %				
			with					
			(c) position of EGR valve	= measured parameter -				
			and with					
			(d) position of EGR valve of previous process cycle	= calculated 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 speed (see Look-Up-Table #81)	>= 850 to 1100 rpm	fail conditions exists for 15 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			with		and			
			(a) minimum engine speed	= 300.00 rpm	(			
			and with		engine coolant temperature	< 126.96 °C		
			(b) minimum idle speed setpoint	= calculated parameter -	and			
			and with		engine coolant temperature	> -7.04 °C		
			(c) factor for calculation of engine speed interval	= 24.00 %	)			
					and			
					idle speed controller active	= TRUE -		
					and			
					vehicle speed	< 1.86 mph		
					and			
					no other torque demanding function active	= TRUE -		
					and			
					setpoint torque of the speed controller	> 0 NM		
					and			
					engine speed	> 300.00 rpm		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Idle Speed Too High	P0507	Detects an idle speed governor that is unable to achieve the desired idle speed and the idle speed is too high.	engine speed	>	minimum value of (a) **OR** (b + (b * c))		engine speed (see Look-Up-Table #81)	>=	850 to 1100	rpm	fail conditions exists for 15 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	<	126.96	°C		
			(b) minimum idle speed setpoint	=	calculated parameter	-	and					
			and with				engine coolant temperature	>	-7.04	°C		
			(c) factor for calculation of engine speed interval	=	24.00	%	)					
							and					
							idle speed controller active	=	TRUE	-		
							and					
							vehicle speed	<	1.86	mph		
							and					
							no other torque demanding function active	=	TRUE	-		
							and					
							setpoint torque of the speed controller	>	0	NM		
							and					
							engine speed	>	300.00	rpm		
							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	<	0.55	mV	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for 5 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	>	2.33	mV	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for 5 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 - Fuel Quantity Lower Than Expected	P054E	This diagnostic monitors the fuel injection quantity at low idle. The ECM compares the actual injection quantity with calculated thresholds. If the actual injection quantity is less than a calibrated threshold, a fault will be set.	Current injection quantity	<	minimum expected injection quantity (map) * factor for calculating the minimum threshold out of the reference map	mm^3/rev	following conditions for time:	>	5.00	sec	fail conditions exists for 1.5 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with (				Current gear unchanged	=	TRUE	-		
			Current gear in park/neutral	=	TRUE	-	and Vehicle speed	<=	1.86	mph		
			and minimum expected injection quantity (see Look-Up Table #43)	=	8.2 to 26.6	mm^3/rev	and Engine operation mode	=	Normal	-		
			and factor for calculating the minimum threshold out of the reference map)	=	1.00	factor	and Engine speed	<=	1300.00	rpm		
			OR				and Engine speed	>=	400.00	rpm		
			Current injection quantity	<	minimum expected injection quantity (map) * factor for calculating the minimum threshold out of the reference map	mm^3/rev	and Engine coolant temperature	>	-20.04	°C		
			with				and Ambient air temperature	>	-7.04	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(				and					
			Current gear in park/neutral	=	FALSE	-	Idle speed controller active	=	TRUE	-		
			and				and					
			minimum expected injection quantity (see Look-Up Table #44)	=	10.8 to 40.4	mm^3/rev	Fluctuation range of engine speed	<	16383.50	rpm		
			and				and					
			factor for calculating the minimum threshold out of the reference map	=	1.00	factor	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			)				and					
							basic enable conditions met:	=	see sheet enable tables	-		
Idle Control System - Fuel Quantity Higher Than Expected	P054F	This diagnostic monitors the fuel injection quantity at low idle. The ECM compares the actual injection quantity with calculated thresholds. If the actual injection quantity is greater than a calibrated threshold, a fault will be set.	Current injection quantity	>	maximum expected injection quantity (map) * factor for calculating the maximum threshold out of the reference map	mm^3/rev	following conditions for time:	>	5.00	sec	fail conditions exists for 1.5 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with				Current gear unchanged	=	TRUE	-		
			(				and					
			Current gear in park/neutral	=	TRUE	-	Vehicle speed	<=	1.86	mph		
			and				and					
			maximum expected injection quantity (see Look-Up-Table #42)	=	61.8 to 117	mm^3/rev	Engine operation mode	=	TRUE	-		
			and				and					
			factor for calculating the maximum threshold out of the reference map	=	1.00	factor	Engine speed	<=	1300.00	rpm		
			)				and					
			OR				Engine speed	>=	400.00	rpm		
							and					
			Current injection quantity	>	maximum expected injection quantity (map) * factor for calculating the maximum threshold out of the reference map	mm^3/rev	Engine coolant temperature	>	-20.04	°C		
			with				and					
			(				Ambient air 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.
			Current gear in park/neutral	=	FALSE	-	and					
			and				Idle speed controller active	=	TRUE	-		
			maximum expected injection quantity (see Look-Up-Table #41)	=	78 to 166.6	mm^3/rev	and					
			and				Fluctuation range of engine speed	<	16383.50	rpm		
			factor for calculating the maximum threshold out of the reference map)	=	1.00	factor	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	P0564	Set illegal range indicates problem on status of the cruise switch information	Switch state provided by Cruise Control frame	=	ILLEGAL RANGE	-	ignition on	=	TRUE	-	fail conditions exists for 2.5 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet enable tables	-		
Cruise Control Resume Switch Circuit	P0567	Resume switch state indicates problem with the circuit	Resume Switch CAN message in high / active state	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 90 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cruise Control Set Switch Circuit	P0568	Set switch state indicates problem with the circuit	Set Switch CAN message in high / active state	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 90 s monitor runs with 0.005 s rate whenever	Special C
							and					
							input circuit active	=	TRUE	-		
							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	-	enable conditions are met	
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 #13)	=	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	-		
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	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.
											test performed once per driving cycle during ECU initialization	
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	Error on starting DC/DC converter of one bank piezo power stage	=	TRUE	-	ignition on and DC/DC converter is in startup	= =	TRUE TRUE	- -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	A
		Monitors and detects the improper operation of the ECM. This is accomplished	DC/DC converter of one bank cannot be switched off	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 0.1 s monitor runs with 0.01 s rate whenever enable conditions are met	
		Monitors and detects the improper operation of the ECM. This is accomplished by monitoring the output of	internal injector driver chip error	=	TRUE	-	Engine running and basic enable condition met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 0.1 s monitor runs with 0.01 s rate whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			faults detected in the SPI communication IC internal	> 485.00 counts	ignition on and NO Pending or Confirmed DTCs:	= TRUE - = see sheet inhibit tables -	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	
			internal supply voltage or internal supply voltage	< 4.2 V > 5.25 V	ignition on and NO Pending or Confirmed DTCs:	= TRUE - = see sheet inhibit tables -	fail conditions exists for 0.08s monitor runs once per trip during pre drive at least twice every 0.08s rate whenever enable conditions are met	
			|(a) - (b)| with (a) parallel redundant calculation of energizing time for fuel injection and with (b) parallel redundant calculation of programmed energizing time for fuel injection	> 72.00 µsec = calculated parameter - = calculated parameter -	programmed energizing time for fuel injection has been read back means programmed energizing time for fuel injection and measured energizing time for fuel injection has been read back means	= TRUE - >= 0 - = TRUE -	fail conditions exists for at least 0.05 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.
							measured energizing time for fuel injection	>=	0	-	are met	
							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	<	-37.99	degrees	engine test active via diagnosis tester	=	FALSE			
			or									
			parallel redundant calculation of angle for pilot injection 1 quantity	>	44.98	degrees						
			)									
			or									
			Path 2:									
			(									
			parallel redundant calculation of angle for main injection quantity	<	-37.99	degrees						
			or									
			parallel redundant calculation of angle for main injection quantity	>	32.98	degrees						
			)									
			or									
			Path 3:									
			(									
			parallel redundant calculation of angle for post injection quantity 1	<	-360.00	degrees						
			or									
			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	<	-183.00	degrees						
			or									
			parallel redundant calculation of angle for post injection quantity 2	>	32.98	degrees						
			)									
			or									
			Path 5:									
			(									
			parallel redundant calculation of angle for post injection quantity 3	<	-183.00	degrees						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			or parallel redundant calculation of angle for post injection quantity 3)	>	0.00	degrees						
			(parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-Table #54)	<	-500 to -50	µsec	redundant engine speed calculation and	>=	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 parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-Table #53))	>	50 to 500	µsec	engine test active via diagnosis tester	=	FALSE	-		
			parallel redundant calculation of post injection 2 quantity	>	120.00	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 #55)	>	200 to 6000	µsec	fuel system is in fuel cut off (see parameter definition line #189)	=	TRUE	-	fail conditions exists for at least 0.8 s monitor runs with 0.04 s rate whenever enable conditions are met	
			and activation counter (intervention) of the surge damper	>=	107.00	counts	for time	>	1.00	sec		
							and redundant engine speed calculation	>	2120.00	rpm		
							and general engine speed demand (see parameter definition line #213)	=	FALSE	-		
							and external torque demand from stability ECU via CAN and	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							external 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	>	0.04	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	>	200.00	rpm		
							and					
							redundant engine speed calculation at start	>	1360	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									
			parallel redundant calculation of averaged wave correction quantity for post injection 3	>=	7.50	mm^3						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(				(				fail conditions exists for 0.120 s monitor runs with 0.01 s rate whenever enable conditions are met	
			rail pressure	<=	20000.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	<	0.19	V		
			or				or					
			rail pressure	>=	164800.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	>	4.18	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 0.5 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	>	0.01	sec		
							and					
							WDA (watch dog) line active	=	TRUE	-		
			WDA (watch dog) shut off due to overvoltage	=	TRUE	-	shut off path test active	=	FALSE	-	fail conditions	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			means internal supply voltage	>	5.25	V	and WDA (watch dog) line active	=	TRUE	-	exists for 0.01 s 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	=	FALSE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and WDA (watch dog) line active	=	TRUE	-		
			WDA (watch dog) shut off because of corrupt question-and-answer communication	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and WDA (watch dog) line active	=	TRUE	-		
							and shut off path test active	=	FALSE	-		
			the actual response time from processor is not equal to the requested response-time	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever	
							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.
											enable conditions are met	
			redundant, independent algorithm for plausibility fault of accelerator pedal signal for safety reasons:				ignition on	=	TRUE	-	fail conditions exists for 0.29 s monitor runs with 0.04 s rate whenever enable conditions are met	
			Path 1:				and					
			|(maximum (a) (b)) - 2 * (maximum (c) (b))|	>	0.29	V	engine test active via diagnosis tester	=	FALSE	-		
			with				and					
			(a) voltage accelerator pedal 1	=	measured parameter	-	Input signal fault present	=	FALSE	-		
			and with				and					
			(b) lower limit for accelerator pedal voltage	=	0.85	V	ADC fault present	=	FALSE	-		
			and with									
			(c) voltage accelerator pedal 2	=	measured parameter	-						
			and									
			(									
			voltage accelerator pedal 1	>	1.54	V						
			or									
			voltage accelerator pedal 2	>	1.54	V						
			)									
			or									
			Path 2:									
			|(maximum (a) (b)) - 2 * (maximum (c) (b))|	>	0.41	V						
			with									
			(a) voltage accelerator pedal 1	=	measured parameter	-						
			and with									
			(b) lower limit for accelerator pedal voltage		0.85	V						
			and with									
			(c) voltage accelerator pedal 2	=	measured parameter	-						
			and									
			(									
			voltage accelerator pedal 1	<=	1.54	V						
			or									
			voltage accelerator pedal 2	<=	1.54	V						
			)									
			Error during positive test processor internal	=	TRUE	-	ignition on and	=	TRUE	-	fail conditions	

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	-	exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			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 0.485 monitor runs at the 0.01 s rate whenever enable conditions are met	
			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	
			repetitions of injection shut-off path test	>=	485.00	counts	ignition on and injection shut-off path test	= =	TRUE ACTIVE	- -	fail conditions exists for more than 0.64 s monitor runs	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											at least twice every 0.08 s rate whenever enable conditions are met	
			prevention of the execution of the shut-off path test	=	TRUE	-	ignition on and injection shut-off path test	= =	TRUE ACTIVE	- -	fail conditions exists for 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			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	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											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	
			piezo injector actuator internal feedback voltage or piezo injector actuator internal feedback voltage	< >	0.00 3.30	V 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 1600.00	 rpm rpm	injection cut off demand from ECM internal monitoring	=	TRUE		fail conditions exists for 0.02 s test performed continuously with 0.02 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 air system control requests	= TRUE -	ignition on	= TRUE -	fail conditions exists for more than 267 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 267 events test performed continuously with 0.01 s	
			security torque limitation request due to implausible quantity setpoint control requests	= TRUE -	ignition on	= TRUE -	fail conditions exists for more than 267 events test performed continuously with 0.01 s	
			indicated torque with (a) modeled inner engine torque and with (b) torque tolerance offset	> (a) + (b) + (c) + (d) - = calculated parameter - = 11.72 %	Engine Running and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for more than 0.28 s monitor runs with 0.04 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 (c) torque of engine speed controller and with (d) torque of surge damper control	= =	calculated parameter calculated parameter	- -					rate whenever enable conditions are met	
			voltage of charging switch or voltage of charging switch if buffer of a bank is not charged completely, or not at all	> >	210.00 210.00	V 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	
			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 s monitor runs with 0.01 s rate whenever enable conditions are met	
			DC/DC converter cannot be switched off.	=	TRUE	-	ignition on	=	TRUE	-		
		ECM Electronic out-put driver circuitry determines if short circuit faults exist on injector charging bank #0.	**Path 1:** Voltage high of injector bank #0 charging switch in case of loaded buffer capacitor or **Path 2:**	 >	 210.00	 V	Engine pre drive	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 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.
			Voltage high of injector bank #0 charging switch in case of not loaded buffer capacitor	>	210.00	V					conditions are met	
		ECM Electronic out-put driver circuitry determines if short circuit faults exist on injector charging bank #1.	**Path 1:**				Engine pre drive	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	
			Voltage high of injector bank #1 charging switch in case of loaded buffer capacitor	>	210.00	V						
			or **Path 2:** Voltage high of injector bank #1 charging switch in case of not loaded buffer capacitor	>	210.00	V						
Control Module Analog to Digital Performance	P060B	Electronic ECM circuitry determines if ADC is correctly converting signals within the correct time periods.	time for calibration of ADC	>=	0.30	sec	ignition on	=	TRUE	-	fail conditions exists for 0.01 s test performed continuously 0.01 s	A
			voltage at ADC test voltage input	<	4.73	V	ignition on	=	TRUE	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	
			or voltage at ADC test voltage input	>	4.83	V						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Voltage at ADC for acceleration pedal signal 2 or Voltage at ADC for acceleration pedal signal 2	>= 0.25 V < 0.00 V	ignition on and (Status Info of ADC monitoring)	= TRUE - = No Load Test Pulse Active (released every 320 msec)	fail conditions exists for at least 0.12 s monitor runs with 0.01 s rate whenever enable conditions are met	
			(ratio metric correction factor or ratio metric correction factor)	< 0.95 factor > 1.05 factor	ignition on	= TRUE -	fail conditions exists for at least 0.15 s test performed continuously	
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)| with (a) redundant calculated engine speed and with (b) engine speed	>= 400.00 rpm = calculated parameter - = measured parameter -	redundant calculated engine speed and engine synchronization	>= 600.00 rpm = TRUE -	fail conditions exists for more than 0.32 s monitor runs with 0.04 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.
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 for time and battery voltage for time and ignition on and basic enable conditions met:	= FALSE - > 1.00 sec > 11.00 V > 3.00 sec = TRUE - = see sheet enable tables -	fail conditions exists for 0.27s monitor runs with 0.2 s rate whenever enable conditions are met	B
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 for time and battery voltage for time and ignition on and basic enable conditions met:	= FALSE - > 1.00 sec > 11.00 V > 3.00 sec = TRUE - = see sheet enable tables -	fail conditions exists for 0.5s monitor runs with 0.2 s rate whenever enable conditions are met	B
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 for time and battery voltage	= FALSE - > 1.00 sec > 11.00 V	fail conditions exists for 0.27 s monitor runs 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.
					for time and ignition on and basic enable conditions met:	> 3.00 sec = TRUE - = see sheet enable tables -		
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 counts = 3 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
Sensor Reference Voltage "A" Circuit/Open	P0641	Sensor supply voltage 1 circuitry determines if faults related to maintaining the supply voltage level exists.	Reference supply voltage 1 or Reference supply voltage 1	≤ 4.70 V ≥ 5.30 V	Ignition on and basic enable conditions met:	= TRUE - = TRUE -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
Sensor Reference Voltage "B" Circuit/Open	P0651	Sensor supply voltage 2 circuitry determines if faults related to maintaining the supply voltage level exists.	Reference supply voltage 2 or Reference supply voltage 2	≤ 4.70 V ≥ 5.30 V	Ignition on and basic enable conditions met:	= TRUE - = TRUE -	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.
Sensor Reference Voltage "C" Circuit/Open	P0697	Sensor supply voltage 3 circuitry determines if faults related to maintaining the supply voltage level exists.	Reference supply voltage 3	≤	4.70	V	Ignition on	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
			or				and					
			Reference supply voltage 3	≥	5.30	V	basic enable conditions met:	=	TRUE	-		
Internal Control Module O2 Sensor Processor Performance Bank 1	P064D	A/F sensor O2 signal monitor based on comparison to internal ECM circuit	Filtered A/F sensor circuit output with reference to internal ECM calibration resistor	>=	0.20	V	following conditions met for time:	>=	0.26	sec	fault exists for more than 6 sec; monitor runs at 0.1 s when enable conditions are met	B
			within time period	=	0.10	sec	**Common conditions:**					
							Engine is running	=	TRUE	-		
							for time	>	8.00	sec		
							Operation point 1:					
							(					
							Injection quantity	>=	4.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	500.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							or					
							Operation point 2:					
							(					
							Injection quantity	>=	60.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	3000.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							Battery voltage	>	11.00	V		
							DPF regeneration is not active	=	FALSE	-		
							for time	>	0.50	sec		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
		A/F sensor O2 signal monitor based on comparison to internal ECM circuit	Filtered A/F sensor circuit output with reference to internal ECM calibration resistor	=<	-0.20	V	following conditions met for time:	>=	0.26	sec	fault exists for more than 600 sec; monitor runs at 0.1 s when enable conditions are met	
			within time period	=	0.10	sec	**Common conditions:**					
							Engine is running	=	TRUE	-		
							for time	>	8.00	sec		
							Operation point 1:					
							(					
							Injection quantity	>=	4.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	500.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							or					
							Operation point 2:					
							(					
							Injection quantity	>=	60.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	3000.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							Battery voltage	>	11.00	V		
							DPF regeneration is not active	=	FALSE	-		
							for time	>	0.50	sec		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		A/F sensor resistance comparison to internal ECM calibration resistance	Filtered difference between Internal resistance raw value and internal resistance reference value	>=	0.20	V	following conditions met for time:	>=	0.26	sec	fault exists for more than 600 sec; monitor runs at 0.1 s when enable conditions are met	
			within time	=	0.10	sec	**Common conditions:**					
							Engine is running	=	TRUE	-		
							for time	>	8.00	sec		
							Operation point 1:					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Injection quantity	>=	4.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	500.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							or					
							Operation point 2:					
							(					
							Injection quantity	>=	60.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	3000.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							Battery voltage	>	11.00	V		
							DPF regeneration is not active	=	FALSE	-		
							for time	>	0.50	sec		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		A/F sensor resistance comparison to internal ECM calibration resistance	Filtered difference between Internal resistance raw value and internal resistance reference value	=<	-0.20	V	following conditions met for time:	>=	0.26	sec	fault exists for more than 600 sec; monitor runs at 0.1 s when enable conditions are met	
			within time	=	0.10	sec	**Common conditions:**					
							Engine is running	=	TRUE	-		
							for time	>	8.00	sec		
							Operation point 1:					
							(					
							Injection quantity	>=	4.00	mm^3/rev		
							Injection quantity	=<	180.00	mm^3/rev		
							Engine speed	>=	500.00	rpm		
							Engine speed	=<	4500.00	rpm		
							)					
							or					
							Operation point 2:					
							(					
							Injection quantity	>=	60.00	mm^3/rev		
							Injection quantity	=<	180.00	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.
					Engine speed Engine speed) Battery voltage DPF regeneration is not active for time A/F sensor error status bit (see parameter definition table) NO Pending or Confirmed DTCs: basic enable conditions met:	>= 3000.00 rpm =< 4500.00 rpm > 11.00 V = FALSE - > 0.50 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -		
		A/F sensor internal ECM SPI control monitoring	Initialization register value of SPI chip is different from the value written into SPI chip in previous cycle	= TRUE -	Ignition on NO Pending or Confirmed DTCs: basic enable conditions met:	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	fault exists for more than 0.1 sec; monitor runs at 0.1 s when enable conditions are met	
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 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 - > 0.10 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	A (no MIL)

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fan 1 Control Circuit Low	P0691	Diagnoses the Cooling Fan 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 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	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fan 1 Control Circuit High	P0692	Diagnoses the Cooling Fan 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 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	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Pump Control Module Requested MIL Illumination	P069E	Monitors Serial Data Communication for request from Fuel Pump Control Module to illuminate the MIL. Fuel Pump Control Module controls the active grille shutters on the vehicle	serial data communication from the Fuel Pump Control Module indicates the Fuel Pump Control Module has requested a MIL	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 1 s monitor runs once per trip with 0.25 s rate whenever enable conditions are met	B (No MIL)
							for					
							time	>	3.00	sec		
							and new message is received via CAN	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Engine Oil Pressure Control Circuit/Open	P06DA	Detects an open circuit condition of the oil pump pressure selection switch control circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	=	Open circuit: ≥ 200 kΩ impedance between ECU pin and load	-	ignition is on or running	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.02 s	C
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions are met:	=	see sheet enable tables	-		
Engine Oil Pressure Control Circuit Low	P06DB	Detects a short-to-ground circuit condition of the oil pump pressure selection switch control circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	=	Short-to-ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ignition is on or running	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.02 s	C
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions are met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Engine Oil Pressure Control Circuit High	P06DC	Detects a short-to-battery circuit condition of the oil pump pressure selection switch control circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match	=	Short-to-power: ≤ 0.5 Ω impedance between signal and controller power	-	ignition is on or running	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.02 s	C
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions are met:	=	see sheet enable tables	-		
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors Serial Data Communication for request from TCM to illuminate the MIL.	serial data communication from the TCM indicates the TCM has requested a MIL	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 1 s monitor runs once per trip with 0.25 s rate whenever enable conditions are met	B (No MIL)
							for time	>	3.00	sec		
							and new message is received via CAN	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Brake Switch "B" Circuit	P0703	Rolling counter and protection value evaluation of message received from Body Control Module	number of messages with validation errors	>=	3.00	counts	ignition on	=	TRUE	-	fail conditions exists for 0.015 s test performed continuously 0.005 s rate	C
			in the last number of messages (sliding window) received from body control module	=	10.00	counts	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.
Park/Neutral Position (PNP) Switch Circuit High Voltage	P0851	Detects high voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	ECM (on-board control unit) sensed position based on PNP switch inputs to ECM indicates park or neutral and the GMLAN message from the TCM disagrees	=	TRUE	-	(				fail conditions exist for more than 3000 events monitor runs with 0.01 s rate whenever enable conditions are met	B
							battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							)					
							and					
							engine speed	>=	800.00	rpm		
							and					
							vehicle speed	>=	14.92	mph		
							and					
							engine torque	>=	60.00	Nm		
							and					
							accelerator pedal position	>=	0.00	%		
							and					
							(					
							selected gear position is park	=	FALSE	-		
							or					
							selected gear position is neutral	=	FALSE	-		
							)					
							and					
							basic enable conditions:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852	Detects low voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	GMLAN Message for PNP position indicates park neutral and disagrees with ECM (on-board control unit) sensed position based on PNP switch inputs to ECM	=	TRUE	-	(				fail conditions exist for more than 3000 events monitor runs with 0.01 s rate whenever enable conditions are met	B
							battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							)					
							and					
							engine speed	<=	7000.00	rpm		
							and					
							(					
							selected gear position is park	=	TRUE	-		
							or					
							selected gear position is neutral	=	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	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Traction Control Input Signal	P0856	Detects a failure when a certain number of Traction Control System torque request messages within a defined message group checksum or rolling count values are incorrect	number of messages with validation errors	>=	8.00	counts	ignition on	=	TRUE	-	test performed continuously 0.01 s rate	Special C
			in the last number of messages (sliding window) received from traction control system	=	10.00	counts	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 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	-	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	B
							and					
							ECU Initialization tasks in progress	=	FALSE	-		
							for time	>	0.10	sec		
							and					
							Battery voltage	>	10.50	V		
							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 -	ignition on and ECU Initialization tasks in progress for time and Battery voltage for time and basic enable conditions met: AND NO Pending or Confirmed DTCs	= TRUE - = FALSE - > 0.10 sec > 10.50 V > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.010 s rate whenever enable conditions are met	B
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 -	ignition on and ECU Initialization tasks in progress for time and Battery voltage for time and basic enable conditions met: AND NO Pending or Confirmed DTCs	= TRUE - = FALSE - > 0.10 sec > 10.50 V > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.010 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.
Reductant Injector High Control Circuit Low Voltage	P1048	Detects a short circuit to ground on the high side of the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. 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 2 s monitor runs with 0.010 s rate whenever enable conditions are met	B
							and ECU Initialization tasks in progress	=	FALSE	-		
							for time	>	0.10	sec		
							and Battery voltage	>	10.50	V		
							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 Injector High Control Circuit High Voltage	P1049	Detects a short circuit to battery on the high side of the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ignition on	=	TRUE	-	fail conditions exists for 2 s monitor runs with 0.010 s rate whenever enable conditions are met	B
							and ECU Initialization tasks in progress	=	FALSE	-		
							for time	>	0.10	sec		
							and Battery voltage	>	10.50	V		
							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 conditions in fuel cut-off	rail pressure deviation from setpoint calculated as the absolute value of difference between desired and actual value	>	2500.00	kPa	rail pressure control commanded during injection timing correction learning phase	=	TRUE	-	fail conditions exists for 720 crank revolutions	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and				monitor runs with 0.02 s rate whenever enable conditions are met	
							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	-		
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 conditions are met	B
							and					
							engine-off time is valid	=	TRUE			
			|(a) - (b)| (see Look-Up-Table #3)	>	25 to 999	°C	and					
			with				ambient temperature	>	-60.04	°C		
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-	and					
							engine speed (see Look-Up-Table #81)	>	850 to 1100	rpm		
			(b) captured charge air cooler upstream temperature at start	=	measured parameter	-	for					
							time	>	0.01	sec		
							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	-		
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 #80)	>	30 to 3276.7	°C	ignition on	=	TRUE	-	fail conditions exists for 0.1 s monitor with 0.1 s rate	B
			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) dosing valve coil temperature	=	calculated parameter	°C	state of selective catalytic reduction system	=	STANDBY or NO PRESSURE CONTROL	-	whenever enable conditions are met	
			and with (b) oxidation catalyst downstream temperature	=	measured parameter	°C	and 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	<	3.00	sec		
							and engine off time	>	28800.00	sec		
							and urea pump motor output duty cycle	=	0.00	%		
							and Max [(a), (b)] - Min [(a), (b)] where	<=	15.00	K		
							(a) ambient temperature	=	measured parameter	-		
							(b) oxidation catalyst downstream temperature	=	measured parameter	-		
							and urea dosing valve output duty cycle	>	3.00	%		
							and coil current measurement is valid (e.g. no dosing valve errors present)	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
O2 Sensor Performance - Signal High During Moderate Load Sensor 1	P11A6	A/Fsensor signal monitoring in part load mode, which monitors a deviation of the raw A/F sensor signal and calculated sensor signal	difference between measured A/F sensor concentration and filtered calculated A/F concentration -> refer to Column 1 in the table (see Look-Up-Table #51)	>	0.04 to 0.07	-	following conditions met for Integrated air mass:	>	80	g	fail conditions exists for 0.1 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			Note: Calculated A/F concentration is calculated as a function of Injection Quantity and Air Mass per cylinder (which is calculated on MAF sensor and EGR)				Engine speed ->refer to the Column 1 in the table (see Look-Up-Table #47)	<	2700 to 4500	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Injection quantity -> refer to the Column 1 in the table (see Look-Up-Table #49)	>	-1 to 16	mm^3/rev		
							Injection quantity -> refer to the Column 1 in the table (see Look-Up-Table #48)	<	0.4 to 44	mm^3/rev		
							Air mass per cylinder ->refer to the Column 1 in the table (see Look-Up-Table #46)	>	0.09 to 0.25	g/rev		
							Air mass per cylinder ->refer to the Column 1 in the table (see Look-Up-Table #45)	<	0.253 to 0.45	g/.rev		
							DPF regeneration not active	=	TRUE	-		
							Post injection is not active (post injection only active during cold start catalyst heating or DPF regeneration)	=	TRUE	-		
							Temperature of A/F sensor (based on sensor internal resistance)	=<	805.96	°C		
							Temperature of A/F sensor (based on sensor internal resistance)	>=	823.96	°C		
							Absolute change in actual calculated O2 concentration	<	0.02	-		
							for time	>=	1.50	sec		
							Fuel volume in fuel tank	>=	0.00	L		
							Battery voltage	>=	11.00	V		
							Decel Fuel Cut-Off (DFCO)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P11A9	A/Fsensor signal monitoring in part load mode, which monitors a deviation of the raw A/F sensor signal and calculated sensor signal	difference between filtered calculated A/F concentration and measured A/F sensor concentration -> refer to Column 1 in the table (see Look-Up-Table #50)	>	0.06 to 0.07	-	following conditions met for Integrated air mass:	>	80	g	fail conditions exists for 0.1 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			Note: Calculated A/F concentration is calculated as a function of Injection Quantity and Air Mass per cylinder (which is calculated on MAF sensor and EGR)				Engine speed refer to the column 1 (see Look-Up-Table #47)	<	2700 to 4500	rpm		
							Injection quantity -> refer to the Column 1 in the table (see Look-Up-Table #49)	>	-1 to 16	mm^3/rev		
							Injection quantity -> refer to the Column 1 in the table (see Look-Up-Table #48)	<	0.4 to 44	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.
							Air mass per cylinder ->refer to the Column 1 in the table (see Look-Up-Table #46)	>	0.09 to 0.25	g/rev		
							Air mass per cylinder ->refer to the Column 1 in the table (see Look-Up-Table #45)	<	0.253 to 0.45	g/.rev		
							DPF regeneration not active	=	TRUE	-		
							Post injection is not active (post injection only active during cold start catalyst heating or DPF regeneration)	=	TRUE	-		
							Temperature of A/F sensor (based on sensor internal resistance)	>=	805.96	°C		
							Temperature of A/F sensor (based on sensor internal resistance)	<=	823.96	°C		
							Absolute change in actual calculated O2 concentration	<	0.02	-		
							for time	>=	1.50	sec		
							Fuel volume in fuel tank	>=	0.00	L		
							Battery voltage	>=	11.00	V		
							Decel Fuel Cut-Off (DFCO)	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
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	EWMA filtered delta high upstream NOx monitor	<	0.00	factor	Duration for averaging upstream NOx sensor signal and NOx model	>=	6.00	sec	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	A
			Threshold for high upstream NOx rationality check	=	(a) * (b) * (c) * (d) * (e)							
			(a) Base threshold for high upstream NOx rationality check (see Look-Up-Table #74)	=	0.410034 to 1.400024	factor	(					
			(b) correction factor dependent on NOx model	=	1	factor	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
			(c) correction factor dependent on engine coolant temperature and transmission gear	=	1	factor	Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
			(d) correction factor dependent on ambient pressure	=	1	factor	for time		30.00	sec		
			(e) correction factor dependent on relative humidity	=	1	factor	ambient pressure	>=	74.80	kPa		
							ambient pressure	<=	106.00	kPa		
							ambient temperature	>=	-30.04	°C		
							ambient temperature	<=	79.96	°C		
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					filtered modeled NOx concentration percent positive deviation	<=	0.120117	factor		
					filtered modeled NOx concentration percent positive deviation	>=	0.120117	factor		
					for time	>=	2.00	sec		
					)					
					for time	>	2.00	sec		
					time since start	>	0.00	sec		
					engine coolant temperature	>=	59.96	°C		
					engine coolant temperature	<=	125.96	°C		
					Exhaust gas temperature range at Upstream NOx sensor (see Look-Up-Table #76)	>0	0 to 1	factor		
					Vehicle speed	>=	12.43	mph		
					Vehicle speed	<=	37.29	mph		
					Enable range for the plausibility check of Upstream NOx sensor (see Look-Up-Table #70)	≠0	0 to 1	factor		
					for time	>	1.00	sec		
					filtered modeled NOx-concentration upstream of the SCR	>=	65.00	ppm		
					filtered modeled NOx-concentration upstream of the SCR	<=	600.00	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	-		
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.32	factor		
					number of high upstream NOx monitor measurements for current driving cycle of fast initialization mode	>=	1.00	counts		
					number of high upstream NOx monitor measurements for fast initialization mode	>=	4.00	counts		
					EWMA Rapid Response mode:					
					EWMA filtered delta high upstream NOx monitor	>	0.31	factor		
					(a) - (b)	<	0.00	factor		
					(a) threshold of high upstream NOx monitor	=	calculated parameter	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(b) measured value of high upstream NOx monitor	=	calculated parameter	-		
							filter coefficient for Rapid Response mode	=	0.38	factor		
							number of high upstream NOx monitor measurements for current driving cycle of Rapid Response mode	>=	1.00			
							Total number of high upstream NOx monitor measurements for Rapid Response mode	>=	6.00	counts		
							EWMA stabilized mode:					
							filter coefficient for stabilized mode	=	0.16	factor		
							number of high upstream NOx monitor measurements for stabilized mode	=	1	counts		
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	Detects a low deviation of the measured NOx sensor concentration from the modeled NOx concentration	EWMA filtered delta low upstream NOx monitor	<	0.00	factor	Duration for averaging upstream NOx sensor signal and NOx model	>=	6.00	sec	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	A
			Threshold for low upstream NOx rationality check	=	(a) * (b) * (c) * (d) * (e)	factor	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
			(a) Base threshold for high upstream NOx rationality check (see Look-Up-Table #75)	=	-0.670044 to -0.52002	factor	Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
			(b) correction factor dependent on NOx model	=	1	factor	for time		30.00	sec		
			(c) correction factor dependent on engine coolant temperature and transmission gear	=	1	factor	ambient pressure	>=	74.80	kPa		
			(d) correction factor dependent on ambient pressure	=	1	factor	ambient pressure	<=	106.00	kPa		
			(e) correction factor dependent on relative humidity (see Look-Up-Table #69)	=	1 to 1.2	factor	ambient temperature	>=	-30.04	°C		
							ambient temperature	<=	79.96	°C		
							((					
							filtered modeled NOx concentration percent positive deviation	<=	0.120117	factor		
							filtered modeled NOx concentration percent negative deviation	>=	0.120117	factor		
							)					
							for time	>=	2.00	sec		
							for time	>	2.00	sec		
							time since start	>	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.
					Coolant engine down stream temperature	>=	59.96	°C		
					Coolant engine down stream temperature	<=	125.96	°C		
					Exhaust gas temperature range at Upstream NOx sensor (see Look-Up-Table #76)	>0	0 to 1	factor		
					Vehicle speed	>=	12.43	mph		
					Vehicle speed	<=	37.29	mph		
					for time	>	1.00	sec		
					Enable range for the plausibility check of Upstream NOx sensor (see Look-Up-Table #70)	≠0	0 to 1	factor		
					for time	>	1.00	sec		
					filtered modeled NOx-concentration upstream of the SCR	>=	65.00	ppm		
					filtered modeled NOx-concentration upstream of the SCR	<=	600.00	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	-		
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.32	factor		
					number of low upstream NOx monitor measurements for current driving cycle of fast initialization mode	>=	1.00	counts		
					number of low upstream NOx monitor measurements for fast initialization mode	>=	4.00	counts		
					EWMA Rapid Response mode:					
					EWMA filtered delta low upstream NOx monitor	>	0.21	factor		
					(a) - (b)	<	0.00	factor		
					(a) measured value of low upstream NOx monitor	=	calculated parameter	-		
					(b) threshold of low upstream NOx monitor	=	calculated parameter	-		
					filter coefficient for Rapid Response mode	=	0.38	factor		
					number of low upstream NOx monitor measurements for current driving cycle of Rapid Response mode	>=	1.00			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Total number of low upstream NOx monitor measurements for Rapid Response mode	>=	6.00	counts		
							EWMA stabilized mode:					
							filter coefficient for stabilized mode	=	0.16	factor		
							number of low upstream NOx monitor measurements for stabilized mode	=	1	counts		
NOx Sensor Offset Learning at Min Limit - Bank 1 Sensor 1	P11D3	Detects NOx offset value min of the upstream NoX Sensor	average NOx offset value	<	-90.00	ppm	(				fault exists for more than 2 DFCO events; monitor runs at 0.02 s when enable conditions are met	B
			NOx sensor signal averaged over time	=	1.00	sec	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							Oxidation Catalyst upstream temperature	>=	99.96	°C		
							and					
							Oxidation Catalyst upstream temperature	<=	599.96	°C		
							and					
							Engine running	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							)					
							for time	>	160	sec		
							following conditions for time:	=	1.00	sec		
							EGR valve position	>=	0.00	%		
							EGR valve position	<=	100.00	%		
							NOx sensor measured lambda	>	0.00	-		
							for time	>=	0.50	sec		
							DFCO (Decel Fuel Cut-Off) active	=	TRUE	-		
							NOx sensor 1 ready status (see parameter definition)	=	TRUE	-		
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							Engine Running (see parameter definition)	=	TRUE	-		
							for time	>	20.00	sec		
							engine speed	>=	1000.00	rpm		
							engine speed	<=	3500.00	rpm		
							integrated air mass flow (see Look-Up-Table #30)	>	100 to 500	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NOx Sensor Offset Learning at Max Limit - Bank 1 Sensor 1	P11D4	Detects NOx Offset value max. of the upstream NoX Sensor	average NOx offset value	>	50.00	ppm	(				fault exists for more than 2 DFCO events; monitor runs at 0.02 s when enable conditions are met	B
			NOx sensor signal averaged over time	=	1.00	sec	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							Oxidation Catalyst upstream temperature	>=	99.96	°C		
							and					
							Oxidation Catalyst upstream temperature	<=	599.96	°C		
							and					
							Engine running	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							)					
							for time	>	160	sec		
							following conditions for time:	=	1.00	sec		
							EGR valve position	>=	0.00	%		
							EGR valve position	<=	100.00	%		
							NOx sensor measured lambda	>	0.00	-		
							for time	>=	0.50	sec		
							DFCO (Decel Fuel Cut-Off) active	=	TRUE	-		
							NOx sensor 1 ready status (see parameter definition)	=	TRUE	-		
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							Engine Running (see parameter definition)	=	TRUE	-		
							for time	>	20.00	sec		
							engine speed	>=	1000.00	rpm		
							engine speed	<=	3500.00	rpm		
							integrated air mass flow (see Look-Up-Table #30)	>	100 to 500	g		

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 - Sensing Element Status Signal 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	status NOx-self-diagnosis	=	2 (NOx self diagnosis aborted)	-	**General Conditions required before Shutdown:**				fault exists 3 times per driving-cycle; monitor run at 0.1 s rate during ECM afterrun	B
			for number of counts	>=	1.00	counts	minimum engine run time	>=	10.00	sec		
							NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
							measured downstream NOx	<	200.00	ppm		
							temperature upstream of the SCR catalyst	>=	49.96	°C		
							temperature upstream of the SCR catalyst	<=	499.96	°C		
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1000.00	rpm		
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							NOx sensor heater status	=	TRUE	-		
							means					
							NOx sensor has sent via CAN that heater temperature setpoint has been reached (i.e. dewpoint achieved and no heater faults)	=	TRUE	-		
							Afterrun Conditions:					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							ECM operating in Afterrun (please see the definition)	=	TRUE	-		
							vehicle speed	=	0			
							measured downstream NOx	<=	200.00	ppm		
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1000.00	rpm		
							NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
							maximum duration in afterrun	<=	150	sec		
							number of self-diagnostic attempts	>=	4.00	counts		
							status sensor reaction in afterrun	<	50.00	sec		
							(sensor is reheated as necessary prior to start of afterrun test execution)					
							means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NOx sensor has sent via CAN that heater temperature setpoint has been reached (i.e. dewpoint achieved and no heater faults)	=	TRUE	-		
NOx Sensor Current Performance Bank1 Sensor 1	P11DB	Detects a failure of the feedback performance of upstream NoX sensor	Ratio of valid to invalid upstream NOx sensor status time count	>	0.50	ratio	Sufficient number of valid and invalid NOx status time (sum of valid and invalid NOx status for diagnostic determination)	>=	20.00	sec	fault exists for more than 3 events; monitor runs at 0.1 s when enable conditions are met	B
							engine cranking	=	TRUE	-		
							engine speed (see Look-Up-Table #81)	>	850 to 1100	rpm		
							A delay time required for the NOx sensor to give valid response)	>	20.00	sec		
							Upstream NoX sensor detects a lean A/F mixture	=	TRUE	-		
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							following conditions for time:	>	300.00	sec		
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	99.96	°C		
							SCR upstream temperature	<=	599.96	°C		
							Lambda signal is in steady state condition (see Look-Up-Table #28) for time	<=	0 to 0.5	-		
							Duration time for lambda steady state condition)	>=	5.00	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit 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 downstreamNOx sensor status time (sum of valid and invalid NOx status for diagnostic determination)	>=	20.00	sec	fault exists for more than 3 events; monitor runs at 0.1 s when enable conditions are met	B
							engine cranking	=	TRUE	-		
							engine speed (see Look-Up-Table #81)	>	850 to 1100	rpm		
							A delay time required for the NOx sensor to give valid response)	>	20.00	sec		
							Downstream NoX sensor detects a lean A/F mixture	=	TRUE	-		
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							following conditions for time:	>	300.00	sec		
							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.
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	99.96	°C		
							SCR upstream temperature	<=	599.96	°C		
							Downstream Lambda signal is in steady state condition (see Look-Up-Table #27) for time	<=	0 to 0.5	-		
							Duration time for lambda steady state condition)	>=	5.00	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 0.5 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					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and					
							Open Load Diagnosis active	=	FALSE	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit 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 adaptation 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				and					
			throttle valve control deviation adaptation calculated out of difference between desired and actual value	>	10.00	%	throttle valve is driven to a mechanical stop	=	FALSE	-		
							and					
							engine Coolant Temperature	<	199.96	°C		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							offset learning for the throttle valve was successful in the previous driving cycle	=	TRUE	-		
							and					
							engine post drive/ afterun	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		Detects offset value which are not plausible at the open and closed throttle position	**Path 1:**				(				fail conditions exists for 0.005 s monitor runs once per drivingcycle with 0.005 s rate whenever enable conditions are met	
			learned throttle valve offset position at open or closed position	<	-20.00	%	engine coolant temperature	>=	-30.04	°C		
			or				and					
			learned throttle valve offset position at open or closed position	>	20.00	%	engine coolant temperature	<=	127.96	°C		
			or				)					
			Path 2:				and					
			difference between the maximum and minimum positions learned at closed position	>	30.00	%	(					
			or				battery voltage	>=	11.00	V		
			Path 3:									
			difference between the maximum and minimum positions learned at open position	>	30.00	%	and					
							battery voltage	<=	655.34	V		
							)					
							and					
							Throttle Valve is not frozen consisting of:					
							(					
							temperature downstream charge air cooler	>=	6.06	°C		
							or					
							Engine coolant temperature	>=	6.06	°C		
							for					
							time	>	10.00	sec		
							)					
							and					
							engine speed	=	0	rpm		
							and					
							engine post drive/ afterun	=	TRUE	-		
							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.
					and basic enable conditions met	 see sheet enable tables -		
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 for time and starter is active cranking for time and basic enable conditions met: and Throttle Valve Actuator Solenoid Control Circuit and Open Load Diagnosis active NO Pending or Confirmed DTCs	> 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables - = ACTIVE - = FALSE - = see sheet inhibit tables -	fail conditions exists for 0,5 s monitor runs with 0.005 s rate whenever enable conditions are met	B
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 for time and starter is active cranking for time and basic enable conditions met: and Throttle Valve Actuator Solenoid Control Circuit and Open Load Diagnosis active	> 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables - = ACTIVE - = FALSE -	fail conditions exists for 0,5 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.
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
Injector 1 Control Circuit Shorted	P1248	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 are met	A
Injector 2 Control Circuit Shorted	P1249	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
Injector 3 Control Circuit Shorted	P124A	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 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 Shorted	P124B	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 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 for time and NO Pending or Confirmed DTCs: and ignition on and basic enable conditions met:	> 11.00 V > 3.00 sec = see sheet inhibit tables - = TRUE - = see sheet enable tables -	fail conditions exists for 0.07 s monitor runs with 0.01 s rate whenever enable conditions are met	A
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 -	(engine speed or engine post drive/ afterun)	= 0 rpm = TRUE -	fail conditions exists for 0.1 s monitor runs with 0.1s rate whenever enable conditions	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and	-	are met	
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					for time	> 6.00 sec		
					and			
					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 #62)	< 0 to 15000 kPa	(		fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	A
					state machine rail pressure control transitioning pressure control valve mode	= TRUE -		
					or			
					state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	= TRUE -		
					or			
					state machine rail pressure control equal transitioning to metering unit pressure control mode	= TRUE -		
					)			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			rail pressure (see Look-Up-Table #67)	< 0 to 15000 kPa	(			
					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			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables		
			rail pressure (see Look-Up-Table #65)	< 0 to 15000 kPa	state machine rail pressure control equal to metering unit control mode and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -		
			rail pressure	> 175000.00 kPa	(state machine rail pressure control transitioning pressure control valve mode or state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve) or state machine rail pressure control equal transitioning to metering unit pressure control mode) and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 1.01 s. monitor runs with 0.02 s rate whenever enable conditions are met	
			rail pressure	> 175000.00 kPa	(state machine rail pressure control equal to pressure control valve or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)) and basic enable conditions met:	= TRUE - = TRUE - = 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 -		
			rail pressure	> 175000.00 kPa	state machine rail pressure control equal to metering unit control mode and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -		
Intake Manifold Runner Actuator Feedback Signal Circuit Low	P12B0	Variable Swirl Valve position feedback signal (PWM) low indicating and out of range low failure	variable swirl valve position sensor duty cycle	<= 5.00 %	basic enable conditions met:	= see sheet enable tables -	fail conditions exists for more than 3 s monitor runs 0.1 s rate whenever enable conditions are met	B
Intake Manifold Runner Actuator Feedback Signal Circuit High	P12B1	Variable Swirl Valve position feedback signal (PWM) low indicating and out of range low failure	variable swirl valve position sensor duty cycle	>= 95.00 %				
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:** Pilot Injection 1 is prohibited due to exceeding the allowed number of injections (see general description for details) or **Path 2:** Pilot Injection 1 is prohibited due to collision (overlap) with Main Injection and Pilot Injection 2 (see general description or **Path 3:**	= TRUE - = TRUE -	engine operating mode which means: Cold Start Injection Monitoring and engine operating mode state transition and engine coolant temperature and engine coolant temperature	= exhaust / SCR heat-up state bit mask = ENABLED - = FALSE - > -10.00 °C < 96.00 °C	fail conditions exists for 20 revs 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.
			Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Pilot or	=	TRUE	-				
			Path 4: Pilot Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details) or	=	TRUE	-				
			Path 5: Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details) or	=	TRUE	-				
			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	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Post Injection 1 (see general description or					
			Path 10: Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Post or	= TRUE -				
			Path 11: Post Injection 1 is prohibited due to exceeding the allowed number of injections (see general description for details) or	= TRUE -				
			Path 12: Post Injection 2 is prohibited due to collision (overlap) with Post Injection 1 (see general description for details) or	= TRUE -				
			Path 13: Injector circuit or activation errors (setpoint deviation) occurred when the injector was being energized for Post	= 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 for	= ACTIVE - > 11.00 V > 3.00 sec = FALSE -	fail conditions exists for 3,5 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.
					time and basic enable conditions met: and NO Pending or Confirmed DTCs	> 3.00 sec = see sheet enable tables - = see sheet inhibit 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	> 0.05 g/rev	(Engine speed Engine speed and injection quantity injection quantity and ambient pressure and engine coolant temperature and EGR control is in closed loop for time and EGR control is active for time and exhaust gas system regeneration mode for time and Engine is running for time and Actuator position EGR Valve Actuator position EGR Valve and Engine speed Engine speed and injection quantity injection quantity and	 >= 1400.00 rpm <= 2700.00 rpm >= 40.00 mm^3/rev <= 130.00 mm^3/rev > 74.80 kPa > 69.96 °C = TRUE - > 1.50 sec = TRUE - > 0.00 sec = FALSE - > 5.00 sec = TRUE - > 0.00 sec > 1.00 % < 51.00 % >= 1500.00 rpm <= 2600.00 rpm >= 52.00 mm^3/rev <= 100.00 mm^3/rev 	fail conditions exists for 15 s monitor runs with 0.1s 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.
							desired delta air mass flow	>	-0.50	g/sec		
							desired delta air mass flow	<	-0.03	g/sec		
							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	>=	0.04	g/rev	(				fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable conditions are met	B
							Engine speed	>=	1400.00	rpm		
							Engine speed	<=	2700.00	rpm		
							and					
							injection quantity	>=	40.00	mm^3/rev		
							injection quantity	<=	130.00	mm^3/rev		
							and					
							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 is running	=	TRUE	-		
							for time	>	0.00	sec		
							and					
							Actuator position EGR Valve	>	1.00	%		
							Actuator position EGR Valve	<	51.00	%		
							and					
							Engine speed	>=	1500.00	rpm		
							Engine speed	<=	2600.00	rpm		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					injection quantity injection quantity and desired delta air mass flow desired delta air mass flow and difference of the air mass and NO Pending or Confirmed DTCs:) for time and basic enable conditions met:	>= 52.00 mm^3/rev <= 120.00 mm^3/rev > 0.02 g/sec < 0.60 g/sec > 0 g/rev = see sheet inhibit tables - > 0.40 sec = 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 and battery voltage for time and starter is active cranking for time and basic enable conditions met: and NO Pending or Confirmed DTCs	= ACTIVE - > 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) 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 and battery voltage	= ACTIVE - > 11.00 V	fail conditions exists for 3 s monitor runs with 0.005 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.
							for time and starter is active cranking for time and basic enable conditions met: and NO Pending or Confirmed DTCs	 > = > = =	 3.00 FALSE 3.00 see sheet enable tables see sheet inhibit tables	 sec - sec - -	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: and NO Pending or Confirmed DTCs	= > > = > = =	ACTIVE 11.00 3.00 FALSE 3.00 see sheet enable tables see sheet inhibit tables	- V sec - sec - -	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 2 Temperature Too Low	P144E	Detects insufficient exhaust temperature or control deviation during DPF regeneration. Temperature readings are compared to desired temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the outer control loop of the temperature controller and deviation from the temperature setpoint for outer control loop (	>= >	0.53 maximum of (a) or (b+(c-d))	- °C	controller deviation status is active depending on engine operation point out of (see Look-Up-Table #24) for time and	= >=	0 to 1 10.00	- sec	fail conditions exists for 60 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.
			with				active operation mode of the outer control loop	=	TRUE	-		
			(a) limitation of the temperature threshold	=	70.00	°C	means					
			and with				(					
			(b) temperature threshold value for maximum deviation	=	70	°C	temperature upstream of the oxidation catalyst	>	229.96	°C		
			and with				and					
			(c) desired temperature value of outer control loop of the exhaust gas temperature control	=	calculated parameter	-	(					
			and with				temperature downstream of the oxidation catalyst	>	219.96	°C		
			(d) temperature setpoint value of outer control loop of the exhaust gas temperature control	=	calculated parameter	-	and					
			)				(					
							temperature downstream of the oxidation catalyst	<	679.96	°C		
							and					
							particulate filter temperature for activated post injection	<	679.96	°C		
							)					
							and					
							environmental pressure	>=	74.80	kPa		
							environmental temperature	>=	-20.04	°C		
							engine coolant temperature	>=	49.96	°C		
							engine coolant temperature	<=	199.96	°C		
							service DPF regeneration commanded (idle regen only commanded through GM tool)	=	FALSE	-		
							vehicle speed	>=	3.11	mph		
							vehicle speed	<=	124.30	mph		
							accelerator pedal position	>	3.00	%		
							for time	>	1.00	sec		
							exhaust gas mass flow	<	910.27	g/sec		
							for time	>=	21474836.47	sec		
							and					
							stable temperature conditions	=	TRUE	-		
							means					
							(					
							temperature upstream of particulate filter	>	500.00	°C		
							for time	>	0.00	sec		
							)					
							and					
							basic enable condition 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 2 Temperature Too High	P144F	Detects insufficient exhaust temperature or control deviation during DPF regeneration. Temperature readings are compared to desired temperature values as an indication of an excessive exhaust gas temperature.	commanded control value of the outer control loop of the temperature controller	<=	0.10	-	controller deviation status is active depending on engine operation point out of (see Look-Up-Table #25)	=	0 to 1	-	fail conditions exists for 60 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature setpoint for outer control loop	<	minimum of (a) and (b-(c-d))	°C	time	>=	10.00	sec		
			(				and					
			with				active operation mode of the outer control loop	=	TRUE	-		
			(a) limitation of the temperature threshold	=	-70.00	K	means					
			and with				(					
			(b) temperature threshold value for minimum deviation	=	-70	K	temperature upstream of the oxidation catalyst	>	229.96	°C		
			and with				and					
			(c) desired temperature value of outer control loop of the exhaust gas temperature control	=	calculated parameter	-	(					
			and with				temperature downstream of the oxidation catalyst	>	219.96	°C		
			(d) temperature setpoint value of outer control loop of the exhaust gas temperature control	=	calculated parameter	-	and					
			)				(					
							temperature downstream of the oxidation catalyst	<	679.96	°C		
							and					
							particulate filter temperature for activated post injection	<	679.96	°C		
							)					
							and					
							environmental pressure	>=	74.80	kPa		
							environmental temperature	>=	-20.04	°C		
							engine coolant temperature	>=	49.96	°C		
							engine coolant temperature	<=	199.96	°C		
							service DPF regeneration commanded (idle regen only commanded through GM tool)	=	FALSE	-		
							vehicle speed	>=	3.11	mph		
							vehicle speed	<=	124.30	mph		
							accelerator pedal position	>	3.00	%		
							for time	>	1.00	sec		
							exhaust gas mass flow	<	910.27	g/sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>=	21474836.47	sec		
							and					
							stable temperature conditions	=	TRUE	-		
							means					
							(					
							temperature upstream of particulate filter	>	500.00	°C		
							for time	>	0.00	sec		
							)					
							and					
							basic enable condition met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Particulate Matter Sensor Signal Message Counter Incorrect	P1472	PM Sensor Control Unit (SCU) CAN communication: SCU signal data length is incorrect	SCU diagnostic signal data length is incorrect	=	TRUE	-	Battery voltage (ECM)	>=	11.00	V	fault exists for more than 1.4 sec; monitor runs at 0.1 s when enable conditions are met	B
							Ignition on	=	TRUE	-		
							for time	>	1.20	sec		
Particulate Matter Sensor Compensation Value Missing/Not Received	P147F	Range check of sensor sensitivity calibration factor (detected failures: calibration factor manipulated, wrong or not transmitted)	**Path 1:**				Ignition on	=	TRUE	-	fault exists for more than 0.1 sec; monitor runs at 0.1 s once per trip	B
			Sensitivity Factor adjustment value sent from the sensor control unit (SCU) in the engine ECM has been transmitted	=	TRUE	-	SCU is in the state "ready"	=	TRUE	-		
			Sensor sensitivity calibration factor	<	0.75	factor	means					
			OR				Battery voltage (ECM)	>=	11.00	V		
			Sensor sensitivity calibration factor	>	1.25	factor						
			OR									
			Path 2:									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Sensitivity Factor adjustment value sent from the sensor control unit (SCU) in the engine ECM has been transmitted	=	FALSE	-						
			Time after SCU "ready" until sensor sensitivity calibration factor transmitted	>=	2.00	sec						
TCM Engine Speed Request Signal Message Counter Incorrect	P150C	Detects implausible engine speed request information received from the TCM	**Path 1:**				ignition on	=	TRUE	-	fail conditions exists for 0.01 s test performed continuously 0.01 s	A
			(				and					
			number of messages with rolling count / protection value errors detected	>=	7.00	counts	basic enable conditions met:	=	see sheet enable tables	-		
			with				and					
			number of consecutive frames	=	10.00	counts	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	>	5.00	counts						
			)									
			or									
			Path 3:									
			time since last frame with valid protection value was received from transmission	>	0.08	sec						
Cruise Control Switch Data Integrity	P155A	Set invalid data indicated problem on status of the cruise switch information	Switch state provided by Cruise Control frame	=	DATA INVALID	-	ignition on	=	TRUE	-	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							input circuit active	=	TRUE	-		
							means:					
							(					
							Bus off or error passive on CAN	=	FALSE	-		
							and					
							The rolling counter and protection value validation is enabled for this CAN frame	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							Frame enabled. The EMC is authorized to read the frame	=	TRUE	-		
							and					
							Protection value error	=	FALSE	-		
							)					
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Particulate Filter Efficiency Below Threshold Bank 1	P2002	Monitoring of particulate filter efficiency using particulate sensor (PM sensor)	**Path1:**				Particulate sensor is in the "measurement" state when failure occurs	=	TRUE	-	fault exists for more than 1 event; monitor runs at 0.1 s when enable conditions are met once per trip	B
			measured and filtered interdigital electrode(IDE) current	>	12.00	uA	which means					
			measured and filtered interdigital electrode(IDE) current	<	41.00	uA	Sensor regeneration complete	=	TRUE	-		
			when	<			and					
			integrated reciprocal of the predicted trigger time	=	1.00	-	PM sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							DPF regeneration not active		TRUE	-		
			or				Calculated soot particles mass based on sensor flow resistance	>=	0.00	g		
							Calculated soot particles mass based on sensor flow resistance	<=	300.00	g		
			Path2:				(					
			measured interdigital electrode(IDE) current	>=	41.00	uA	Exhaust gas velocity at particulate sensor position	>=	0.00	m/sec		
							Exhaust gas velocity at particulate sensor position	<=	40.00	m/sec		
			then				for					
			Integrated reciprocal of the predicted trigger time	<=	1.00	-	time	>=	5.00	sec		
			when				)					
			waiting time for particulate sensor regeneration has elapsed	=	60.00	sec	(					
							Exhaust gas pressure	>=	75.00	kPa		
							Exhaust gas pressure	<=	135.00	kPa		
			Note: Two sensor regeneration performed following Path 2 test to confirm sensor not electrically shorted (see general description for flowchart process for Path 2)				for					
							time	>=	10.00	sec		
							)					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Exhaust gas temperature Exhaust gas temperature for time) (Engine running (NOx sensor downstream concentration temperature of particulate matter sensor) and NOx sensor downstream concentration	>= 64.96 °C <= 399.96 °C >= 5.00 sec = TRUE - < 200.00 ppm < 249.96 °C < 1500.00 ppm		
Intake Manifold Runner Control Circuit/Open Bank 1	P2008	Variable Swirl Valve actuator open circuit	Voltage low during driver off state (indicates open circuit)	= Open Circuit: ≥ 200 K Ω impedance between ECU pin and load -	basic enable conditions met:	= see sheet enable tables -	fail conditions exists for more than 3 s monitor runs 0.1 s rate whenever enable conditions are met	B
Intake Manifold Runner Control Circuit Low Bank 1	P2009	Variable Swirl valve actuator short circuit to ground	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	basic enable conditions met:	= see sheet enable tables -	fail conditions exists for more than 3 s monitor runs 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.
Intake Manifold Runner Control Circuit High Bank 1	P2010	Variable Swirl valve actuator short circuit to battery	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for more than 3 s monitor runs 0.1 s rate whenever enable conditions are met	B
Intake Manifold Runner Performance Bank 1	P200A	Monitors the commanded variable swirl valve position versus actual measured PWM position for a negative deviation	difference of the commanded variable swirl valve position from the actual measured variable swirl valve position	<	-10.00	%	basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for more than 5 s monitor runs 0.1 s rate whenever enable conditions are met	B
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
		Monitors the commanded variable swirl valve position versus actual measured PWM position for a positive deviation	difference of the commanded variable swirl valve position from the actual measured variable swirl valve position	>	10	%	basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for more than 5 s monitor runs 0.1 s rate whenever	
							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.
							enable conditions are met	
		Monitors the commanded variable swirl valve position response time, in the afterrun, from an intrusively commanded closed to open position	time required for variable swirl valve to reached open position where variable swirl valve open position	> 2.00 sec < 33.20 %	engine off time battery voltage battery voltage basic enable conditions met: NO Pending or Confirmed DTCs	>= 5.00 sec >= 11.00 V <= 655.34 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for more than 2 s monitor runs 0.1 s rate whenever enable conditions are met	
		Monitors the commanded variable swirl valve position response time, in the afterrun, from an intrusively commanded open to closed position	time required for variable swirl valve to reached closed position where variable swirl valve open position	> 2.00 sec > 80.80 %	engine off time battery voltage battery voltage basic enable conditions met: NO Pending or Confirmed DTCs	>= 5.00 sec >= 11.00 V <= 655.34 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for more than 2 s monitor runs 0.1 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.
		Monitors the commanded variable swirl valve position response time, in the afterrun, from an intrusively commanded value (11%) which checks the linkage integrity of the variable swirl valve	variable swirl valve position	<	80.40	%	engine off time	>=	5.00	sec	fail conditions exists for more than 1 s monitor runs 0.1 s rate whenever enable conditions are met	
			or				battery voltage	>=	11.00	V		
			variable swirl valve position	>	86.00	%	battery voltage	<=	655.34	V		
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit 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	<	0.55	V	ignition on	=	TRUE	-	fail conditions exists for 5 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as temperature downstream of oxidation catalyst	<	- 50	°C	and 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	>	2.33	V	ignition on	=	TRUE	-	fail conditions exists for 5 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as temperature downstream of oxidation catalyst	>	1000	°C	and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Level Sensor	P203B	Reductant level plausibility check error from CAN	CAN message "Reductant Level Plausibility Check Error" from reductant tank level evaluation module which means	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 1 s rate whenever enable conditions are met	B
			(				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 0.01 s rate whenever enable conditions are met	B
			(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.
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	-	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions are met	
			(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	Detects an open circuit or an overtemperature condition in the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. 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 5 s monitor runs with 0.010 s rate whenever enable conditions are met	B
							and					
							ECU Initialization tasks in progress	=	FALSE	-		
							for					
							time	>	0.10	sec		
							and					
							Battery voltage	>	10.50	V		
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							AND					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
Reductant Injector Control Circuit Low Voltage	P2048	Detects a short circuit to ground in the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. 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 2 s monitor runs with 0.010 s rate whenever enable conditions are met	B
					and ECU Initialization tasks in progress	= FALSE -		
					for time	> 0.10 sec		
					and Battery voltage	> 10.50 V		
					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 Injector Control Circuit High Voltage	P2049	Detects a short circuit to battery in the Reductant Injector Control Circuit	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. 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 2 s monitor runs with 0.010 s rate whenever enable conditions are met	B
					and ECU Initialization tasks in progress	= FALSE -		
					for time	> 0.10 sec		
					and Battery voltage	> 10.50 V		
					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 Pressure Sensor Circuit Range/Performance	P204B	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	B
							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	>	74.80	kPa		
							and ambient temperature	>	-6.64	°C		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pressure Sensor Circuit Low	P204C	Measured reductant pump pressure sensor signal low voltage	Reductant pump pressure sensor signal	<	0.41	V	ignition on	=	TRUE	-	fail conditions exists for more than 0.050 s. monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as:				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			reductant pump pressure	<	0	kPa	basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pressure Sensor Circuit High	P204D	Measured reductant pump pressure sensor signal high voltage	Reductant pump pressure sensor signal	>	4.80	mV	ignition on	=	TRUE	-	fail conditions exists for more than 5 sec. monitor runs with 0.01 s rate whenever enable conditions	B
			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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											are met	
Reductant System Performance Bank 1	P204F	Unsuccessful reductant pressure build up	Reductant Pump Module Pressure	<=	375.00	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			
							AND Reductant Defrost check (please see the definition)	=	1.00	-		
							AND ambient pressure	>	0.00	kPa		
							AND ambient temperature	>	-30.04	°C		
							AND number of pressure build-up attempts in pressure buildup and ventilation states	>=	20	counts		
							AND Dwell time in Pressure Build up substate	>=	15.00	sec		
							AND Dwell time in ventilation substate	>=	0.30	sec		
							AND Urea heater release reason	≠	COMPONENT PROTECTION	-		
							AND NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							AND basic enable conditions met:	=	see sheet enable tables	-		
Reductant Tank Temperature Sensor Performance	P205B	**Path 1:**									fail conditions exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	B
		The temperature difference between reductant tank temperature and diesel fuel temperature are compared to an upper threshold after sufficient engine-off duration	(a) - (b)	>	35.06	°C	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.
			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	>	600.00	sec		
							Max [(a), (b), (c)] - Min [(a), (b), (c)]	<=	14.96	°C		
							where					
							(a) Oxidation Catalyst upstream temperature	=	measured parameter	-		
							(b) Oxidation Catalyst downstream 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: OR The temperature difference between reductant tank temperature and diesel fuel temperature are compared to a lower threshold after sufficient engine-off duration					ignition on	=	TRUE	-	fail conditions exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	
			(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	>	600.00	sec		
			(b) fuel temperature	=	measured parameter	-	Max [(a), (b), (c)] - Min [(a), (b), (c)]	<=	14.96	°C		
							where					
							(a) Oxidation Catalyst upstream temperature	=	measured parameter	-		
							(b) Oxidation Catalyst downstream 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	<	1.00	hex	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	A
			Corresponds to a temperature of	<=	-55.0	°C	and					
			Corresponds to a resistance of	>=	1200	kOhm	No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	TRUE	-		
			Corresponds to a voltage of	>=	5.0	V						
Reductant Tank Temperature Sensor Circuit High	P205D	Detects an out of range high reading of the Reductant Tank Temperature Sensor via CAN Message or an invalid (initialization) value of the Reductant Tank Temperature CAN message	Raw value of the CAN message for the Reductant Tank Temperature	>	1022.00	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						
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 3s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or integrated heat quantity of exhaust gas temperature sensor 1	>	(a) / (b) * (c) / (d) * (e) * (g)	-	for time	>	120.00	sec		
			with (a) exhaust gas mass flow	=	calculated parameter	-	and time since start	>	120.00	sec		
			and with (b) factor		3.60	g/sec	and (					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			and with				exhaust-gas temperature sensor 1	>	-20.04	°C		
			(c) heat capacity	=	1200.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 1	<	499.96	°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	<	20.00	°C		
							for					
			and with				time	=	10.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 1	=	-120.00	°C	and					
			and with				engine operation point suitable for diagnostic	=255	255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 1	=	100.00	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 1	>	20.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 1	>	20.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 1	<	40.00	kJ		
							)					
							and					
							engine has been in normal mode for time	>=	120.00	sec		
							or					
							engine has been in exhaust warm-up mode for time	>=	120.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Temperature Sensor 2 Performance	P2084	Detects a fault in the exhaust temperature sensor 2 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 2	<	(a) / (b) * (c) / (d) * (e) * (f)		exhaust gas system regeneration mode	=	FALSE		fail conditions exists for 3s monitor runs 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.
			or				for				whenever enable conditions are met	
			integrated heat quantity of exhaust gas temperature sensor 2	>	(a) / (b) * (c) / (d) * (e) * (g)		time	>	120.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	120.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 2	>	-20.04	°C		
			(c) heat capacity	=	1200.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 2	<	499.96	°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	<	30.00	°C		
							for					
			and with				time	=	10.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 2	=	-140.00	K	and					
			and with				engine operation point suitable for diagnostic	=	255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 2	=	100.00	K	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 2	>	20.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 2	>	20.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 2	<	40.00	kJ		
							)					
							and					
							engine has been in normal mode for time	>=	120.00	sec		
							or					
							engine has been in exhaust warm-up mode for time	>=	120.00	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.
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 3s 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	>	120.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	120.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 3	>	-20.04	°C		
			(c) heat capacity	=	1200.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 3	<	499.96	°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 3	<	30.00	°C		
							for					
			and with				time	=	10.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 3	=	-120.00	K	and					
			and with				engine operation point suitable for diagnostic	=	255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	=	100.00	K	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 3	>	15.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 3	>	20.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 3	<	40.00	kJ		
							)					
							and					
							engine has been in normal mode for time	>=	120.00	sec		
							or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							engine has been in exhaust warm-up mode for time	>=	120.00	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 short-to-ground) The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ignition on	=	TRUE	-	fail conditions exists for 6.2 s monitor runs with 0.10 s rate whenever enable conditions are met	A
							and					
							ECU Initialization tasks in progress	=	FALSE	-		
							for					
							time	>	0.10	sec		
							and					
							Battery voltage	>	10.50	V		
							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	sec	(				fault exists for more than 0.3 s; monitor runs at 0.1 s whenever enable conditions are met	B
			timer for functional acknowledgement of the reductant pump motor	<=	6	sec	Reductant Pump Warm-up status	=	FALSE	-		
							where the Warm-up state is defined as:					
							(					
							No Pressure control state (please see the definition)	=	TRUE	-		
							SCR Engine State (please see the definition)	=	ON	-		
							((					

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 sec		
					)			
					OR			
					Reductant Defrost check (please see the definition)	= TRUE -		
					))			
					)			
					(			
					ambient temperature	> -6.64 deg 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 -	ignition on	= TRUE -	fail conditions exists for 3 s monitor runs with 0.10 s rate whenever enable conditions are met	B
					and			
					ECU Initialization tasks in progress	= FALSE -		
					for			
					time	> 0.10 sec		
					and			
					Battery voltage	> 10.50 V		
					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 -	ignition on	= TRUE -	fail conditions exists for 3 s monitor runs with 0.10 s rate whenever enable conditions are met	A
					and			
					ECU Initialization tasks in progress	= FALSE -		
					for			
					time	> 0.10 sec		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery voltage for time and basic enable conditions met: AND NO Pending or Confirmed DTCs	> 10.50 V > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -		
Reverting Valve Performance	P20A1	This diagnostic checks the reverting 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 phase	< 0.00 kPa	(Reductant Dosing System state pressure reduction Reductant Dosing System pump relative pressure to initiate test) AND ((Time attempting to reduce dosing pressure AND Reductant Dosing System pump relative pressure after attempting to reduce pressure) OR Reductant Dosing System pump relative pressure after attempting to reduce pressure) (ambient pressure ambient temperature) NO Pending or Confirmed DTCs basic enable conditions met:	 = TRUE - >= 350.00 kPa >= 20.00 sec > 100.00 kPa <= 100.00 kPa > 0.00 kPa > -40.04 °C = see sheet inhibit tables - = see sheet enable tables -	fault exists for more than 1 event 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.
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 -	ignition on and ECU Initialization tasks in progress for time and Battery voltage for time and basic enable conditions met: AND NO Pending or Confirmed DTCs	= TRUE - = FALSE - > 0.10 sec > 10.50 V > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 2 s monitor runs with 0.01 sec rate whenever enable conditions are met	B
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 -	ignition on and ECU Initialization tasks in progress for time and Battery voltage for time and basic enable conditions met: AND NO Pending or Confirmed DTCs	= TRUE - = FALSE - > 0.10 sec > 10.50 V > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.01 sec 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 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 #31)	>	20 to 3276.7	°C	and					
			with				ambient temperature	>	-50.04	°C		
			(a) captured oxidation catalyst downstream temperature at start	=	measured parameter	-	and					
			and with				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	=	measured parameter	-	for					
							time	>	0.10	sec		
							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	-		
Exhaust Gas Temperature Sensor 2/3 Correlation Bank 1	P20E4	Detects biased exhaust temperature sensors by comparing the upstream and downstream particulate filter 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 #32)	>	20 to 3276.7	°C	and					
			with				ambient temperature	>	-50.04	°C		
			(a) captured particle filter downstream temperature at start	=	measured parameter	-	and					
			and with				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured particle filter upstream temperature at start as reference temperature	=	measured parameter	-	for					
							time	>	0.10	sec		
							and					
							engine post drive/ afterun	=	FALSE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 -		
Reductant Pressure Too Low	P20E8	Compare Reductant tank pressure with lower thresholds under metering control	Reductant Pump Module Pressure	< 420.00 kPa			fail conditions exists for more than 60.0 s monitor runs with 0.1 s rate whenever enable conditions are met	B
					status of SCR control sub state (please see the definition)	= Metering control -		
					AND status byte in substate METERING CONTROL	= Running		
					AND Dwell time in Metering control substate	> 2.00 sec		
					AND ambient pressure	> 0.00 kPa		
					AND ambient temperature	> -30.04 °C		
					AND NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					AND basic enable conditions met:	= see sheet enable tables -		
Reductant Pressure Too High	P20E9	**Path 1:**					fail conditions exists for more than 10 s monitor runs with 0.1 s rate whenever enable conditions are met	B
		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 -		
					AND status byte in substate METERING CONTROL	= Running -		
					AND Dwell time in Metering control substate	> 2.00 sec		
					AND ambient pressure	> 0.00 kPa		
					AND			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ambient temperature AND NO Pending or Confirmed DTCs: AND basic enable conditions met:	> -30.04 °C = see sheet inhibit tables - = see sheet enable tables -		
		Path 2: Or Reductant tank pressure high	Unfiltered Reductant Pump Module Pressure	>= 795.00 kPa	ambient pressure AND ambient temperature AND basic enable conditions met:	> 0.00 kPa > -30.04 °C = see sheet enable tables -	fail conditions exists for more than 1 s monitor runs with 0.1 s rate whenever enable conditions are met	
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) where (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details) (see Look-Up-Table #68)	< 0.00 factor = measured parameter factor = -0.262 to -0.149 factor	NO Pending or Confirmed DTCs: for time and Status of NOx signal of upstream NOx sensor (please see the definition) for time Status of NOx signal of downstream NOx sensor (please see the definition) for time (Release of dosing strategy (please see the definition) for time (a) Turn on delay time 1 of status metering strategy (b) Turn on delay time 2 of status metering strategy) and (	= see sheet inhibit tables - > 10.00 sec = Active - > 40.00 sec = Active - > 40.00 sec = TRUE - >= (a) + (b) sec = 180.00 sec = 20.00 sec	fail conditions exists for more than 1 event 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.
					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	=	220.00	sec		
					or					
					integrated upstream NOx	>=	1.50	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	=	220.00	sec		
					or					
					integrated upstream NOx	>=	1.50	g		
					)					
					and					
					(					
					Decrease of Reductant load level (please see the definition)	=	FALSE	-		
					for time	>	300.00	sec		
					)					
					and					
					(					
					Average slow filtered NOx mass flow upstream SCR	<=	0.09	g/sec		
					for time	>	0.50	sec		
					Monitor disable time based on average NOx mass flow and the time (see Look-Up-Table #79)	>	0 to 60	sec		
					)					
					and					
					for time with	>	15.00	sec		
					((					
					SCR temperature gradient (see Look-Up-Table #77)	<	1.36 to 3.96	°C		
					SCR temperature gradient (see Look-Up-Table #78)	>	-3.64 to -2.04	°C		
					filtered SCR catalyst temperature	<=	350.06	°C		
					filtered SCR catalyst temperature	>=	215.06	°C		
					)					
					normalized HC load in SCR catalyst	>	4.00	factor		
					ambient 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.
					ambient temperature	>=	-7.04	°C		
					DPF Regeneration in progress	=	FALSE	-		
					integrated upstream NOx during SCR adaptation plausibility check active	>=	2.00	g		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					for time	>	120.00	sec		
					)					
					SCR NOx Catalyst Efficiency Below Threshold Bank 1 was performed for the current driving cycle	=	FALSE	-		
					(					
					engine speed	>=	-16384.00	rpm		
					engine speed	<=	16383.50	rpm		
					for time	>	0.00	sec		
					)					
					SCR estimated current Reductant load (see Look-Up-Table #72)	>=	0.196 to 1.394	g		
					SCR estimated current Reductant load (see Look-Up-Table #71)	<=	0.23 to 1.64	g		
					(					
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					with					
					for time	>	120.00	sec		
					)					
					Integrated NOx mass upstream SCR (see Look-Up-Table #73)	>	0.65 to 5.5	g		
					for time	>	0.00	sec		
					Average SCR Temperature	<=	350.06	°C		
					Average SCR Temperature	>=	220.06	°C		
					Filtered and delayed upstream NOx raw emission	<=	800.00	ppm		
					Filtered and delayed upstream NOx raw emission	>=	40.00	ppm		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	<=	0.08	g/sec		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	>=	0.00	g/sec		
					Filtered exhaust gas mass flow	<=	63.88	g/sec		
					Filtered exhaust gas mass flow	>=	10.00	g/sec		
					MAP for valid engine operation points for SCR efficiency monitoring	=	1	factor		
					for time	>	0.00	sec		
					Inverse calculated accelerator pedal value	>	5.00	%		
					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.
					basic enable conditions met:	=	see sheet enable tables	-		
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.40	factor		
					number of SCR NOx efficiency measurements for current driving cycle of code clear mode	>=	1.00	counts		
					Total number of SCR NOx efficiency measurements for Code clear mode	>=	2.00	counts		
					EWMA Rapid Response mode:					
					EWMA filtered delta SCR catalyst efficiency	>	0.20	factor		
					(a) - (b)	<	0.00	factor		
					(a) measured SCR catalyst efficiency	=	measured parameter	-		
					(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	=	calculated parameter	-		
					offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	>	0.00	factor		
					filter coefficient for Rapid Response mode	=	0.36	factor		
					number of SCR NOx efficiency measurements for current driving cycle of Rapid Response mode	>=	1.00	counts		
					Total number of SCR NOx efficiency measurements for Rapid Response mode	>=	6.00	counts		
					EWMA filtered value too small in Fast Init. And Rapid Response modes:					
					EWMA filtered delta SCR catalyst efficiency of (a) - (b)	<	0.00	factor		
					(a) measured SCR catalyst efficiency	=	measured parameter	-		
					(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	=	calculated parameter	-		
					EWMA stabilized mode:					
					filter coefficient for stabilized mode	=	0.16	factor		
					number of SCR efficiency measurements for stabilized mode	=	1	counts		

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 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	<=	0.74	V	ignition on	=	TRUE	-	fail conditions exists for 0.20 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	>=	4.78	V	ignition on	=	TRUE	-	fail conditions exists for 0.20 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	<=	0.28	V	ignition on	=	TRUE	-	fail conditions exists for 0.20 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	>=	2.39	V	ignition on	=	TRUE	-	fail conditions exists for 0.20 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 voltages on each sensor.	|maximum value ((a/b) or (c)) - maximum value ((c) or (d))| (see Look-Up-Table #12)	>	0.12 to 0.18	V	ignition on	=	TRUE	-	fail conditions exists for 0.21 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	-	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and with (c) minimum voltage	=	0.45	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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 2	P2149	ECM Electronic 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) and fuel system status	= TRUE - = no fuel cut off -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Reductant tank heater short circuit	P214F	Detects a tank heater short circuit by detecting high conductance in the heater	a >= b with (a) maximum conductance of the urea tank heater and with (b) maximum tolerance threshold of the conductance for the urea tank heater	= TRUE - = measured parameter 1/Ohm = 0.55 1/Ohm	ignition switch on and urea tank heater powerstage on and battery voltage and battery voltage and engine off time and urea tank temperature and (	= TRUE - = TRUE - >= 11.00 V <= 655.34 V >= 300.00 sec <= 41.96 °C	fail conditions exists for 0.001 s monitor runs once per trip with 0.001 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.
							conductance of the urea tank heater is steady or falling	=	TRUE	-		
							for					
							time	>	400.00	sec		
							or					
							heater activation time	>=	50.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Temp Sensor (IAT) 1 / 2 Correlation	P2199	Detects biased Humidity Temperature Sensor or MAF Intake Air Temperature Sensor by comparing the measured temperatures at start.	**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 conditions are met	B
							and					
							engine off time is valid	=	TRUE	-		
			|(a) - (b)| (see Look-Up-Table #2)	>	20 to 999	°C	and					
			where				ambient air temperature	>	-60.04	°C		
			(a) captured intake air temperature at start	=	measured parameter	-	and					
			and				ignition on (see parameter definition)	=	TRUE	-		
			(b) captured humidity temperature at start	=	measured parameter	-	for					
							time	>	0.01	sec		
							and					
							engine post drive/ afterun	=	FALSE	-		
							and					
							diagnostic performed in current drive cycle	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Level Sensor 2 Circuit Low	P21AA	CAN message: Discrete level sensor level 2 short to ground error	Reductant Tank Level 2 Error Status	=	1	-	ignition on	=	TRUE	-	fail conditions exists for more than 3 sec. monitor runs	B
			(tank level sensor 2 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-	with 0.01 s rate whenever enable conditions are met	
Reductant Level Sensor 2 Circuit High	P21AB	**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 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	-	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions are met	
			(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 0.01 s rate whenever enable	B
			(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	-		

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	
Reductant Level Sensor 3 Circuit High	P21B0	**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 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	-	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions are met	
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant tank heater open circuit	P21DD	Detects a tank heater open circuit by detecting low conductance in the heater	a <= b	=	TRUE	-	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 (a) maximum conductance of the urea tank heater	=	measured parameter	1/Ohm	and urea tank heater powerstage on	=	TRUE	-		
			and with (b) minimum tolerance threshold of the conductance for the urea tank heater	=	0.27	1/Ohm	and battery voltage	>=	11.00	V		
							and battery voltage	<=	655.34	V		
							and engine off time	>=	300.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							urea tank temperature	<=	41.96	°C		
							and					
							(					
							conductance of the urea tank heater is steady or falling	=	TRUE	-		
							for					
							time	>	400.00	sec		
							or					
							heater activation time	>=	50.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							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	>	10.00	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	>=	99.96	°C		
							SCR upstream temperature	<=	599.96	°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 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.
		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	>	10.00	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	>=	99.96	°C		
							SCR upstream temperature	<=	599.96	°C		
							Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	=	TRUE	-		
							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 DTCs:	=	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)	>	1500.00	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	>	4.00	mm^3/rev		
							or					
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							for time	>	300.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NOx Sensor 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	>	10.00	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	>=	99.96	°C		
							SCR upstream temperature	<=	599.96	°C		
							Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	=	TRUE	-		
							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 DTCs:	=	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	>	10.00	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	>=	99.96	°C		
							SCR upstream temperature	<=	599.96	°C		
							Status of Start stop condition. (Quick Key Cycle Delay) (20 sec)	=	TRUE	-		
							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.
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							NO Pending or Confirmed DTCs:	=	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	>=	1.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							Oxidation Catalyst upstream temperature	>=	99.96	°C		
							and					
							Oxidation Catalyst upstream temperature	<=	599.96	°C		
							and					
							Engine running	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							)					
							for time	>	160	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							No Pending or Confirmed DTC	=	see sheet inhibit tables	-		
Reductant pressure line heater open circuit	P221C	Detects a pressure line heater open circuit by detecting low conductance in the heater	a <= b	=	TRUE	-	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) conductance of the urea pressure line heater	=	measured parameter	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-		
			and with				and					
			(b) minimum tolerance threshold of the conductance for the urea pressure line heater	=	0.35	1/Ohm	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							engine off time	>=	300.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							heater activation time	>=	11.50	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant pressure line heater short circuit	P221D	Detects a pressure line heater short circuit by detecting high conductance in the heater	a >= b	=	TRUE	-	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) conductance of the urea pressure line heater	=	measured parameter	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-		
			and with				and					
			(b) maximum tolerance threshold of the conductance for the urea pressure line heater	=	0.78	1/Ohm	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							engine off time	>=	300.00	sec		
							and					
							heater activation time	>=	11.50	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant 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 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum conductance of the supply module heater	=	measured 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	<=	655.34	V		
							and					
							engine off time	>=	300.00	sec		
							and					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							conductance of the urea supply module heater is steady or falling	=	TRUE	-		
							for					
							time	>	50.00	sec		
							or					
							heater activation time	>=	50.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant 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 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum conductance of the supply module heater	=	measured parameter	1/Ohm	supply module heater powerstage on	=	TRUE	-		
			and with				and					
			(b) maximum tolerance threshold of the conductance for the supply module heater	=	0.46	1/Ohm	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							engine off time	>=	300.00	sec		
							and					
							(					
							conductance of the urea supply module heater is steady or falling	=	TRUE	-		
							for					
							time	>	50.00	sec		
							or					
							heater activation time	>=	50.00	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.
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 1.5 s monitor runs 0.1 s rate whenever enable conditions are met	B
			same as ambient pressure	<=	50.00	kPa	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
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 1.5 s monitor runs 0.1 s rate whenever enable conditions are met	B
			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	-		
O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2237	Monitoring the A/F sensor positive current control circuit (IP circuit) for open circuit failures	Measured O2 concentration	<	0.01	-	Ignition on	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
							DPF regeneration active	=	FALSE	-		
							Decel Fuel Cut-Off (DFCO) active	=	FALSE	-		
							Calculated O2 concentration	>	0.07	-		
							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.
O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2243	Monitoring the A/F sensor reference voltage circuit (UN circuit) for open circuit failures	A/F sensor resistance signal voltage	>	3.00	V	Ignition on	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			and				(					
			A/F sensor raw voltage	<	-1.30	V	duty cycle value during sensor heat-up	>=	90.25	%		
			or				for time	>=	19.50	sec		
			A/F sensor raw voltage	>	3.22	V	or					
							Temperature of A/F sensor (based on sensor internal resistance)	>	804.96	°C		
							and					
							Status bit for valid A/F sensor inner Resistance (see parameter definition table)	=	TRUE	-		
							)					
							Decel Fuel Cut-Off Active (DFCO)	=	FALSE	-		
							Battery voltage	>	11.00	V		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							No permanent heater control deviation error present (P0053)	=	TRUE			
							and					
							Status bit indicates if the ramp up for the A/F sensor heater is released [True = heater ramp up is released, False = heater ramp up is deactivated]	=	TRUE			
							for time	>	37.00	sec		
							or					
							A/F sensor temperature	>	805.96	°C		
							A/F sensor temperature	<	823.96	°C		
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2251	Monitoring the A/F sensor negative current control circuit (VM circuit) for open circuit failures	A/F sensor resistance signal voltage	>	3.00	V	Ignition on	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			and				(					
			A/F sensor raw voltage	>	-0.20	V	duty cycle value during sensor heat-up	>=	90.25	%		
			or				for time	>=	19.50	sec		
			A/F sensor raw voltage	<	0.20	V	or					
							Temperature of A/F sensor (based on sensor internal resistance)	>	804.96	°C		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Status bit for valid A/F sensor inner Resistance (see parameter definition table)	=	TRUE	-		
							)					
							Decel Fuel Cut-Off Active (DFCO)	=	FALSE	-		
							Battery voltage	>	11.00	V		
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							No permanent heater control deviation error present (P0053)	=	TRUE			
							and					
							Status bit indicates if the ramp up for the A/F sensor heater is released [True = heater ramp up is released, False = heater ramp up is deactivated]	=	TRUE			
							for time	>	37.00	sec		
							or					
							A/F sensor temperature	>	805.96	°C		
							A/F sensor temperature	<	823.96	°C		
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							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:**				following conditions for time:	>	0.50	sec	fail conditions exists for 15 s	A
			control deviation of the boost pressure calculated out of difference between desired and actual value	>	(g) * (h)	-	(	=	FALSE	-	test performed continuously	
			with				VNT turbo charger offset adaptation active	=	FALSE	-	0.01 s rate	
			(g) the upper limit (see Look-Up-Table #60)	=	35.0 to 85.0	kPa	and					
			(h) correction factor	=	1.00	factor	turbo charger (VNT) wiping is active	=	FALSE	-		
							and					
							absolute filtered gradient of boost pressure setpoint, PCR_pDesVal , calculated over a time dT constitutes the third condition for detecting the steady state	<	7.50	kPa		
							and					
							injection Quantity	>=	120.00	mm^3/rev		
							injection Quantity	<=	170.00	mm^3/rev		
							and					
							engine Speed	>=	2500.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							engine Speed	<=	3500.00	rpm		
							and					
							particulate filter regeneration	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables			
			Path 2:				following conditions for time:	>	0.50	sec	fail conditions exists for 15 s test performed continuously 0.01 s rate	
			control deviation of the boost pressure calculated out of difference between desired and actual value	<	(i) * (j)	-	(					
			with				VNT turbo charger offset adaptation active	=	FALSE	-		
			(i) the upper limit (see Look-Up-Table #59)	=	-55.0 to -25.0	kPa	and					
			(j) correction factor	=	1.00	factor	turbo charger (VNT) wiping is active	=	FALSE	-		
							and					
							absolute filtered gradient of boost pressure setpoint, PCR_pDesVal , calculated over a time dT constitutes the third condition for detecting the steady state	<	7.50	kPa		
							and					
							injection Quantity	>=	120.00	mm^3/rev		
							injection Quantity	<=	170.00	mm^3/rev		
							and					
							engine Speed	>=	2000.00	rpm		
							engine Speed	<=	3500.00	rpm		
							and					
							particulate filter regeneration	=	FALSE	-		
							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.
Barometric Pressure (BARO) Sensor 2 Circuit Performance	P227B	Correlation at low engine operating speeds of the barometric pressure sensor 1 and barometric pressure sensor 2 for sensor performance failures	| BARO 2 pressure - BARO1 pressure |	>	7.50	kPa	engine speed	<	1500	rpm	fail conditions exists for 7 s monitor runs with 0.01 s rate whenever enable conditions are met	B
							and					
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Barometric Pressure (BARO) Sensor 2 Circuit Low	P227C	Monitoring the barometric pressure sensor 2 circuit for the short circuit to ground indicating an OOR low	barometric pressure sensor 2 circuit voltage	<	1.96	V	Ignition on	=	TRUE	-	fail conditions exists for 5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
		Note: BARO 2 signal used for Humidity Sensor signal correction	same as				and					
			barometric pressure 2	<	50.00	kPa	basic enable conditions met:	=	see sheet enable tables	-		
Barometric Pressure (BARO) Sensor 2 Circuit High	P227D	Monitoring the barometric pressure sensor 2 circuit for short circuit to battery and open circuit indicating an OOR high	barometric pressure sensor 2 circuit voltage	>	4.50	V	Ignition on	=	TRUE	--	fail conditions exists for 5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
		Note: BARO 2 signal used for Humidity Sensor signal correction	same as				and					
			barometric pressure 2	>	115.00	kPa	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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 open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground	-	ignition on	=	TRUE	-	fail conditions exists for 0.28 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and Battery voltage	>	10.50	V		
							for time	>	3.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
			Electronic power stage circuitry determines over temperature on the fuel pressure regulator 2 control circuit.				ignition on	=	TRUE	-	fail conditions exists for 0.28 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and Battery voltage	>	10.50	V		
							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 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	-	ignition on	=	TRUE	-	fail conditions exists for 0.05 s monitor runs with 0.01 s rate whenever enable conditions	A
							and Battery voltage	>	10.50	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 and basic enable conditions met: and NO Pending or Confirmed DTCs	> 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	are met	
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 -	ignition on and Battery voltage for time and basic enable conditions met: and NO Pending or Confirmed DTCs	= TRUE - > 10.50 V > 3.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.28 s monitor runs with 0.01 s rate whenever enable conditions are met	A
O2 Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2297	A/Fsensor signal monitoring in DFCO, which monitors a deviation of the raw A/F sensor signal and calculated sensor signal.	difference between filtered calculated A/F concentration and measured A/F sensor concentration -> refer to Column 2 in the table (see Look-Up-Table #50) Note: Calculated A/F concentration is calculated as a function of Injection Quantity and Air Mass per cylinder (which is calculated on MAF sensor and EGR)	> 0.06 to 0.07 -	following conditions met for Integrated air mass: Engine speed ->refer to the Column 2 in the table (see Look-Up-Table #47) Injection quantity -> refer to the Column 2 in the table (see Look-Up-Table #49) Injection quantity -> refer to the Column 2 in the table (see Look-Up-Table #48) Air mass per cylinder ->refer to the Column 12in the table (see Look-Up-Table #46)	> 80 g < 2700 to 4500 rpm > -1.0 to 16 mm^3/rev < 0.4 to 44 mm^3/rev > 0.09 to 0.25 g/rev	fail conditions exists for 0.1 s monitor runs with 0.02 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.
							Air mass per cylinder ->refer to the Column 2 in the table (see Look-Up-Table #45)	<	0.25 to 0.45	g/rev		
							DPF regeneration not active	=	TRUE	-		
							Post injection is not active (post injection only active during cold start catalyst heating or DPF regeneration)	=	TRUE	-		
							Temperature of A/F sensor (based on sensor internal resistance)	=<	805.96	°C		
							Temperature of A/F sensor (based on sensor internal resistance)	>=	823.96	°C		
							Absolute change in actual calculated O2 concentration	<	0.02	-		
							for time	>=	1.50	sec		
							Fuel volume in fuel tank	>=	0.00	l		
							Battery voltage	>=	11.00	V		
							Decel Fuel Cut-Off (DFCO)	=	TRUE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		A/Fsensor signal monitoring in DFCO, which monitors a deviation of the raw A/F sensor signal and calculated sensor signal.	difference between measured A/F sensor concentration and filtered calculated A/F concentration -> refer to Column 2 in the table (see Look-Up-Table #51)	>	0.04 to 0.07	-	following conditions met for Integrated air mass:	>	80	g	fail conditions exists for 0.1 s monitor runs with 0.02 s rate whenever enable conditions are met	
			Note: Calculated A/F concentration is calculated as a function of Injection Quantity and Air Mass per cylinder (which is calculated on MAF sensor and EGR)				Engine speed ->refer to the Column 2 in the table (see Look-Up-Table #47)	<	2700 to 4500	rpm		
							Injection quantity -> refer to the Column 2 in the table (see Look-Up-Table #49)	>	-1.0 to 16	mm^3/rev		
							Injection quantity -> refer to the Column 2 in the table (see Look-Up-Table #48)	<	0.4 to 44	mm^3/rev		
							Air mass per cylinder ->refer to the Column 12in the table (see Look-Up-Table #46)	>	0.09 to 0.25	g/rev		
							Air mass per cylinder ->refer to the Column 2 in the table (see Look-Up-Table #45)	<	0.25 to 0.45	g/rev		
							DPF regeneration not active	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Post injection is not active (post injection only active during cold start catalyst heating or DPF regeneration)	=	TRUE	-		
							Temperature of A/F sensor (based on sensor internal resistance)	=<	805.96	°C		
							Temperature of A/F sensor (based on sensor internal resistance)	>=	823.96	°C		
							Absolute change in actual calculated O2 concentration	<	0.02	-		
							for time	>=	1.50	sec		
							Fuel volume in fuel tank	>=	0.00	l		
							Battery voltage	>=	11.00	V		
							Decel Fuel Cut-Off (DFCO)	=	TRUE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							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	>	10.00	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	>=	99.96	°C		
							SCR downstream temperature	<=	599.96	°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	-		
		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	>	10.00	sec	fail conditions exists for	

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	more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
					battery voltage	<=	655.34	V		
					SCR downstream temperature	>=	99.96	°C		
					SCR downstream temperature	<=	599.96	°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 Range/Performance Bank 1 Sensor 2	P229F	Compares Delta NOx concentration of downstream NOx sensor with a threshold	Maximum deviation of downstream NOx concentration from the state machine_5	< 3.00 ppm	NO Pending or Confirmed DTCs:	=	See sheet inhibit table	-	fail conditions exists for more than 1 event monitor runs with 0.01s rate whenever enable conditions are met	B
					Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
					for time	>	0.00	sec		
					Status of NOx signal of downstream NOx sensor (please see the definition)	=	TRUE	-		
					for time	>	0.00	sec		
					exhaust gas mass flow	>=	2.78	g/sec		
					engine speed	>	200.00	rpm		
					for time	>	10.00	sec		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					for time	>	0.00	sec		
					SCR catalyst average temperature	>=	180.06	°C		
					SCR catalyst average temperature	<=	279.96	°C		
					SCR catalyst average temperature	>=	400.06	°C		
					SCR catalyst average temperature	<=	700.06	°C		
					(					
					State machine_0 : starting state and waiting for low upstream NOx mass flow / concentration					
					(					
					Filtered upstream NOx mass flow	<	0.03	g/sec		
					Filtered NOx concentration	<	260.00	ppm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Exhaust mass flow message	<	40.28	g/sec		
					for time	<	2.00	sec		
					)					
					State machine_1 : low upstream NOx mass flow /concentration reached					
					(					
					Old State machine_0 : starting state and waiting for low upstream NOx mass flow / concentration	=	TRUE	-		
					for time	>=	2.00	sec		
					Filtered upstream NOx mass flow	<	0.03	g/sec		
					Filtered NOx concentration	<	260.00	ppm		
					Exhaust mass flow message	<	40.28	g/sec		
					captured minimum downstream NOx concentration in State machine 1	=	Measured parameter	ppm		
					)					
					State machine_2 : start Upstream NOx peak					
					(					
					Old State machine_1 : low upstream NOx mass flow /concentration reached	=	TRUE	-		
					(					
					Filtered upstream NOx mass flow	>	0.03	g/sec		
					or					
					Filtered NOx concentration	>	260.00	ppm		
					or					
					Exhaust mass flow message	>	40.28	g/sec		
					)					
					for time	<	1.50	sec		
					))					
					State machine_3 : Upstream NOx peak detection					
					(					
					Old State machine_2 : start Upstream NOx peak	=	TRUE	-		
					for time	>=	1.50	sec		
					Filtered upstream NOx mass flow	>=	0.04	g/sec		
					Filtered NOx concentration	>=	360.00	ppm		
					Exhaust mass flow message	>=	61.12	g/sec		
					for time	>	1.20	sec		
					)					
					State machine_4 : delay for downstream NOx peak evaluation					
					(					
					Old State machine_3 : Upstream NOx peak detection	=	TRUE	-		
					for time	>=	1.20	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Absolute deviation of downstream NOx concentration: | (a) - (b) |	=	Measured parameter	ppm		
							and with					
							(a) Filtered downstream NOx concentration	=	Measured parameter	ppm		
							(b) captured minimum downstream NOx concentration in State machine 1	=	Measured parameter	ppm		
							for time	>	50	sec		
							)					
							State machine_5 : end of downstream NOx peak and evaluation					
							(					
							Old State machine_4 : delay for downstream NOx peak evaluation	=	TRUE	-		
							for time	>=	50	sec		
							Maximum deviation of downstream NOx concentration among different states of state machine	=	3.00	ppm		
							Average upstream NOx mass flow in state machine_3 and _4	>=	0.04	g/sec		
							Average upstream NOx concentration in state machine_3 and _4	>=	320.00	ppm		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							))					
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	Detects an out of range high fault of the downstream NoX Sensor	Downstream NOx sensor signal (raw information received via CAN from NOx sensor)	>	1500.00	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	>	4.00	mm^3/rev		
							or					
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							for time	>	300.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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	>	10.00	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	>=	99.96	°C		
							SCR downstream temperature	<=	599.96	°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	-		
		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	>	10.00	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	>=	99.96	°C		
							SCR downstream temperature	<=	599.96	°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.
NOx Heater Performance Bank 1 Sensor 2	P22A7	Monitoring of the downstream NoX sensor signal readiness	Downstream 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					
							SCR downstream temperature	>=	99.96	°C		
							and					
							SCR downstream temperature	<=	599.96	°C		
							and					
							Engine running	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Downstream NOx Sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							)					
							for time	>	150	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
NOx Sensor Performance - Slow Response High to Low Bank 1 Sensor 1	P22FA	Compare sensor response time with a threshold or if sensor signal does not reach 60% of initial vale within a threshold time	Upstream NOx response time between 30% and 60% of the initial value	>	1.80	sec	engine speed	>=	1320.00	rpm	fault exists for more than 2 events; monitor runs at 0.02 s when enable conditions are met	B
			or				Combusted injection quantity	>=	60.00	mm^3/rev		
			Upstream NOx concentration	>	60% NOx concentration of initial value	-	Combusted injection quantity	<=	(a) + 20	mm^3/rev		
			for time	>=	4.00	sec	(a) initial injection quantity for upstream NOx sensor dynamic response	=	measured parameter	-		
							(b) upper injection quantity limit for upstream NOx sensor dynamic response	=	36.00	mm^3/rev		
							Combusted injection quantity	>=	(a) - 20	mm^3/rev		
							(a) initial injection quantity for upstream NOx sensor dynamic response	=	measured parameter	-		
							(b) lower injection quantity limit for upstream NOx sensor dynamic response	=	36.00	mm^3/rev		
							for time	>	1.20	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Upstream NOx concentration	>=	80.00	ppm		
							Operating condition change from fueling to DFCO					
							Combusted injection quantity	<=	0.00	mm^3/rev		
							for time	>=	1.60	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Performance - Sensing Element 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	>	150.00	%	**General Conditions required before Shutdown:**				fault exists 3 times per driving-cycle; monitor run at 0.1 s rate during ECM afterrun	B
			average stored NOx sensor self-diagnostic result	<	50.00	%	minimum engine run time	>=	10.00	sec		
							NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
							measured downstream NOx	<	200.00	ppm		
							temperature upstream of the SCR catalyst	>=	49.96	°C		
							temperature upstream of the SCR catalyst	<=	499.96	°C		
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1000.00	rpm		
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							NOx sensor heater status	=	TRUE	-		
							means					
							NOx sensor has sent via CAN that heater temperature setpoint has been reached (i.e. dewpoint achieved and no heater faults)	=	TRUE	-		
							Afterrun Conditions:					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							ECM operating in Afterrun (please see the definition)	=	TRUE	-		
							vehicle speed	=	0			
							measured downstream NOx	<=	200.00	ppm		
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1000.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
							maximum duration in afterrun	<=	150	sec		
							number of self-diagnostic attempts	>=	4.00	counts		
							status sensor reaction in afterrun	<	50.00	sec		
							(sensor is reheated as necessary prior to start of afterrun test execution)					
							means					
							NOx sensor has sent via CAN that heater temperature setpoint has been reached (i.e. dewpoint achieved and no heater faults)	=	TRUE	-		
Exhaust Gas Temperature Too High Bank 1	P2428	Detects excessive exhaust gas temperatures in order to protect the diesel particulate filter	One of the following five conditions:	=	TRUE	-	Basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for 6 s test performed continuously 0.1 s rate	A
			with				and					
			(a) oxidation catalyst upstream temperature	>	799.96	°C	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			or									
			(b) oxidation catalyst downstream temperature	>	899.96	°C						
			or									
			(c) particulate filter downstream temperature	>	799.96	°C						
			or									
			(d) difference between oxidation catalyst downstream temperature and the oxidation catalyst upstream temperature	>	600.00	°C						
			or									
			(e) difference between particulate filter downstream temperature and oxidation catalyst downstream temperature	>	400.00	°C						
Exhaust Gas Temperature (EGT) Sensor 3 Sensor Circuit Low Voltage	P242C	Detects low voltage readings on the EGT 3 circuit, indicating an OOR low condition on the EGT 3	particulate filter downstream temperature sensor voltage	<	0.55	V	ignition on	=	TRUE	-	fail conditions exists for 0.05 s monitor runs 0.05 s rate whenever enable	A
			same as				and					
			particulate filter downstream temperature	<	-50.04	°C	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											conditions are met	
Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P242D	Detects high voltage readings on the EGT 3 circuit, indicating an OOR high condition on the EGT 3	particulate filter downstream temperature sensor voltage	>	2.33	V	ignition on	=	TRUE	-	fail conditions exists for 0.05 s monitor runs 0.05 s rate whenever enable conditions are met	A
			same as particulate filter downstream temperature	>	999.6	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter Differential Pressure Sensor Performance	P2453	Checks for range faults of the DPF differential pressure sensor.	Absolute differential pressure of particle filter	>	3.20	kPa	Engine control unit in after-run state	=	TRUE	-	fail conditions exists for 0,2s monitor runs with 0.001 s rate whenever enable conditions are met	B
							and NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							and basic enable conditions met		see sheet enable tables	-		
		Comparison of change in exhaust gas volume to the resulting change in the measured differential pressure sensor reading	(				Exhaust gas volume flow	>=	40.00	m^3/h	fail conditions exists for 3s monitor runs with 0.001 s rate whenever enable	
			Exhaust gas volume flow change	>	100.00	m^3/h/sec	and					
			and				Exhaust gas volume flow	<=	60.00	m^3/h		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Pressure difference change (see Look-Up-Table #26))	< 0.5 to 1.5 kPa/sec	and		conditions are met	
					(Engine Speed)	>= 600.00 rpm		
					for time	> 5.00 sec		
					and NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					basic enable conditions met	= see sheet enable 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	< 0.35 V	ignition on	= TRUE -	fail conditions exists for 2.5 s test performed continuously 0.020 s rate	B
			same as differential pressure	< -3.75 kPa	and basic enable conditions met:	= see sheet enable tables -		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2455	Detects high voltage readings on the DPF differential pressure sensor circuit, indicating an OOR high condition on the circuit	voltage of differential pressure sensor	> 4.50 mV	ignition on	= TRUE -	fail conditions exists for 3 s test performed continuously 0.020 s rate	B
			same as differential pressure	> 100.00 kPa	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) 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	<	0.75	-	following conditions for time	>=	120.00	sec	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
							(					
							engine speed	>=	1000.00	rpm		
							and					
							engine speed	<=	3000.00	rpm		
							)					
							and					
							(					
							injection quantity	>=	9.88	mm^3/rev		
							and					
							injection quantity	<=	120.00	mm^3/rev		
							)					
							and					
							(					
							recirculated exhaust-gas mass flow downstream of the EGR cooler	>=	6.94	g/sec		
							and					
							recirculated exhaust-gas mass flow downstream of the EGR cooler	<=	27.78	g/sec		
							)					
							and					
							EGR controller is active	=	TRUE	-		
							and					
							(					
							(a) - (b)	>=	60.00	K		
							with					
							(a) filtered temperature upstream of EGR-cooler					
							and with					
							(b) engine temperature					
							)					
							and					
							(					
							(a) - (b)	<=	3276.70	°C		
							with					
							(a) filtered temperature upstream of EGR-cooler	=	measured parameter	-		
							and with					
							(b) engine temperature	=	measured parameter	-		
							)					
							and					
							engine coolant temperature	>=	69.96	°C		
							and					
							engine coolant temperature	<=	125.96	°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	>=	5	%		
							and					
							actual valve position of exhaust-gas recirculation	<=	100.00	%		
							)					
							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					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(c) factor for calculation of a soot mass value offset depending on the simulated maximal base soot mass (see Look-Up-Table #61) and with	=	0 to 1040	g	basic enable conditions met:	=	see sheet enable tables	-		
			(d) factor for determination of correction factor for ash in the particulate filter	=	1	factor	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
EGR Cooler Bypass Control Circuit/Open Bank 1	P245A	Monitoring the EGR cooler bypass control circuit for open circuit failures and overtemperature circuit failures	Voltage low during driver off state (indicates open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground	-	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
EGR Cooler Bypass Control Circuit Low Bank 1	P245C	Monitoring the EGR cooler bypass control circuit for circuit low failures	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 with 0.02 s rate whenever enable conditions are met	B
							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.
EGR Cooler Bypass Control Circuit High Bank 1	P245D	Monitoring theEGR cooler bypass control circuit for circuit high failures	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 with 0.02 s rate whenever enable conditions are met	B
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit 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	>	32.00	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	-		
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	>	1.45	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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Closed loop Reductant Injection Control at Limit- Flow too low	P249E	Detects an out of range low of the long term Reductant quantity adaption factor	long term adaptation factor of Reductant quantity	<	0.55	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	-		
EGR Cooler Bypass Control Stuck Bank 1	P24A5	Monitoring of the absolute change in temperature downstream of the EGR cooler after a change in bypass valve position. The first temperature difference is measured when the ECB valve is intrusively commanded closed for a period of time and the second temperature difference is measured when the ECB valve is commanded open for a period of time	Change in temperature downstream of EGR cooler	<	5.00	°C	absolute value of filtered engine torque gradient	<	3276.70	Nm/sec	fail conditions exists for more than 0.1 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							for time		0.20	sec		
							engine speed	>=	515.00	rpm		
							engine speed	<=	1130.00	rpm		
							EGR flow rate	>	20.00	-		
							for time	>	0.20	sec		
							vehicle speed	<	1.86	mph		
							DPF regeneration mode active	=	FALSE	-		
							engine coolant temperature	>=	64.96	°C		
							engine coolant temperature	<=	125.96	°C		
							filtered signal of the exhaust gas temperature	>	129.96	°C		
							time between monitoring attempts	>	60.00	sec		
							diagnostic completed this dc	=	FALSE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							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.
Particulate Matter Sensor Circuit Range/Performance	P24AF	PM Sensor bypass current rationality check	Measured particulate sensor Interdigital Electrode (IDE) current after sensor regeneration	>	5.00	µA	PM Sensor temperature	>	200.00	°C	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	B
							and					
							PM Sensor temperature	<	425.00	°C		
							Particulate sensor regeneration is completed	=	TRUE	-		
							Battery voltage (ECM)	>=	11.00	V		
							IDE supply voltage	>=	41.55	V		
							and					
							IDE supply voltage	<=	49,72	V		
							Ignition on	=	TRUE	-		
							for time	>	3.00	sec		
Particulate Matter Sensor Heater Control Circuit Range/Performance	P24B4	The PM sensor protection tube monitor uses the cooling effect of exhaust gas flow inside protection tube during protection heating, to ensure the exhaust gas is reaching the sensor. If the change in heater voltage is less than a threshold a fault is set (detected failures: protection tube plugged or manipulated, or sensor removed from exhaust stream)	accumulated change in heater voltage	<	100.00	%	Accumulated change in exhaust gas velocity	>	30.00	m/sec	fault exists for more than 0.1 sec; monitor runs at 0.1 s once per trip	B
			with				(					
			accumulated change in heater voltage	=	((a) / (b)) * (100)	-	Absolute, filtered and temperature compensated exhaust gas acceleration	>	0.65	m/sec^2		
			where				and					
			(a) change in the heater voltage	=	measured parameter	-	Absolute, filtered and temperature compensated exhaust gas acceleration	<	6.51	m/sec^2		
			and with				)					
			(b) minimum change in the heater voltage	=	1.10	V	for time	>	0.90	sec		
							Diagnosis by the local unit is released means	=	TRUE	-		
							(					
							PM sensor temperature	>	190.00	°C		
							and					
							PM sensor temperature	<	210.00	°C		
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Time has elapsed since diagnosis by the local unit is released	>=	15.00	sec		
							Protection heating is active	=	TRUE	-		
							means					
							PM sensor heater target temperature	=	200	degC		
							PM sensor dewpoint achieved (please see the definition)	=	FALSE	-		
							Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
							Sensor temperature at engine start	>	-10.04	°C		
							and					
							Sensor temperature at engine start	<	249.96	°C		
							Exhaust gas temperature	>	-10.04	°C		
							and					
							Exhaust gas temperature	<	179.96	°C		
							PM sensor temperature start temperature	>	-10.04	°C		
							and					
							PM sensor temperature start temperature	<	99.96	°C		
							Battery voltage (ECM)	>=	11.00	V		
Particulate Matter Sensor Heater Resistance	P24B7	Rationality check of heater resistance (heater aged), executed once after Power-up of the powertrain main relay	A functional error of the heater self diagnosis of the particulate sensor is detected in the sensor control unit	=	TRUE	-	Functional heater self diagnosis is tested	=	TRUE	-	fault exists for more than 0.1 sec; monitor runs at 0.1 s when enable conditions are met	B
			means				means					
			Electric heater resistance based on temperature as measured by temperature meander (see Look-Up-Table #33)	>	2.93 to 4.13	Ohm	(					
			or				Battery voltage (ECM)	>=	11.00	V		
			Electric heater resistance based on temperature as measured by temperature meander (see Look-Up-Table #34)	<	1.09 to 1.81	Ohm	PM sensor temperature	>=	-30.00	°C		
							and					
							PM sensor temperature	<=	150.00	°C		
							(a) - (b)	<	150.00	°C		
							with					
							(a) maximum PM sensor temperature	=	calculated parameter	-		
							and with					
							(b) minimum PM sensor temperature	=	calculated parameter	-		
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Debouncing time for the functional heater self diagnosis	> 0.00 sec		
ECM/PCM Power Input Signal	P2505	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 and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for more than 1 event monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	B
ECM Power Relay Circuit Performance	P2510	Detects stuck power relay that is not responding to ECM commands to power down or a relay that is opening too early in power down. Stuck on is determined by timer values longer than possible if relay opened at end of after run.	counter value out of EEPROM for open the main relay	> 2.00	ignition on and engine pre drive and basic enable conditions met:	= TRUE - = TRUE - = 256.00 -	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with 0.02 s rate whenever enable conditions are met	B
		Opening too soon is indicated by a lack of EEPROM write at the last after run.	sticky main relay is detected means time after request to open the main relay	= TRUE - > 2.00 sec	ignition off and engine pre drive and battery voltage	= TRUE - = FALSE - > 0.50 V	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with	

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: and NO Pending or Confirmed DTCs:	= =	see sheet enable tables see sheet inhibit tables	- -	0.02 s rate whenever enable conditions are met	
Torque Management Request Input Signal "A"	P2544	Detects implausible torque request information received from the TCM	**Path 1:** number of messages with rolling count / protection value errors detected with number of consecutive frames or **Path 2:** internal calculated checksum value for transmission is not equal the received value and number of fault results	 >= = = >	 7.00 10.00 TRUE 15.00	 - - - -	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	= = =	TRUE see sheet enable tables see sheet inhibit tables	- - -	fail conditions exist for 0.005 s test performed continuously 0.005 s rate	B
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 same as boost pressure position	< <	0.23 4,6	V %	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 0.5 s test performed continuously 0.01 s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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	>	4.68	V	ignition on	=	TRUE	-	fail conditions exists for 0.5 s test performed continuously 0.01 s rate	B
			same as boost pressure position	>	93,5	%	and 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	>	10.00	%	engine running	=	TRUE	-	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							and valve not jammed	=	FALSE	-		
							and					
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	<	-10.00	%	engine speed	>=	500.00	rpm		
							and system not faulty	=	TRUE	-		
							and adaption not active	=	FALSE	-		
							and offset learned since last clearing of fault code memory	=	TRUE	-		
							and engine running	=	TRUE	-		
							for time	>	1.00	sec		
							and (Engine temperature enable condition	>=	69.96	°C		
							and Engine temperature enable condition	<=	125.96	°C		
							) and (Air temperature enable condition	>=	-15.04	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							Air temperature enable condition	<=	199.86	°C		
							)					
							and					
							Governor Deviation Diagnosis not disabled	=	TRUE	-		
							and					
							(					
							brake position sensor voltage	<	1.20	V		
							for					
							time (see Look-Up-Table #35)	>	0 to 15	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable 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	>	5400.00	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	<	(a) * (b)	-	and					
			or				engine post drive/ afterun	=	TRUE	-		
			Path 2:				and					
			acquired engine off time	>	(c) * (b)	-	basic enable conditions met:	=	see sheet enable tables	-		
			(									
			where									
			(a) lower tolerance factor	=	0.94	factor						
			and									
			(b) evaluation time period	=	20.00	sec						
			and									
			(b) upper tolerance factor	=	1.06	factor						
			)									
MIL Control Circuit Low	P263A	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	=	TRUE	-	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	A (no MIL)
							and					
							ignition on	=	TRUE	-		
							and					
							ECU Initialization tasks in progress	=	FALSE	-		
							for time	>	0.10	sec		
							and					
							ECU Shutdown tasks in progress	=	FALSE	-		
							for time	>	1.00	sec		
							and					
							Battery voltage	>	10.50	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.
MIL Control Circuit High	P263B	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 = FALSE > 0.10 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	A (no MIL)
Fuel Supply Heater Control Circuit/Open	P2687	Diagnoses the Fuel Filter Heater low side driver circuit for open 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 for time and battery voltage for time and engine speed (see Look-Up-Table #81) for time and basic enable conditions met:	= FALSE > 1.00 sec > 11.00 V > 3.00 sec > 850 to 1100 rpm > 0.10 sec = see sheet enable tables -	fail conditions exists for 2 s monitor runs 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.
Fuel Supply Heater Control Circuit Low	P2688	Diagnoses the Fuel Filter Heater low side driver circuit for short circuit to ground 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 2 s 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 engine speed (see Look-Up-Table #81)	>	850 to 1100	rpm		
							for time	>	0.10	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Supply Heater Control Circuit High	P2689	Diagnoses the Fuel Filter Heater low side driver circuit for short circuit to battery 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 conditions are met	B
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and engine speed (see Look-Up-Table #81)	>	850 to 1100	rpm		
							for time	>	0.10	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 1 Injector Data Incompatible	P268C	Detects a unprogrammed Injector Calibration Data (IQA) in ECM	**Path 1:**				engine pre drive	=	TRUE	-	fail conditions exist for 1 s	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			the checksum of the injector adjustment code value is plausible	=	FALSE	-	and				monitor runs once per driving cycle during predrive with 1 s rate	
							basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 3 Injector Data Incompatible	P268E	Detects a unprogrammed 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	B
			the checksum of the injector adjustment code value is plausible	=	FALSE	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 4 Injector Data Incompatible	P268F	Detects a unprogrammed 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	B
			the checksum of the injector adjustment code value is plausible	=	FALSE	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 2 Injector Data Incompatible	P268D	Detects a unprogrammed 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	B
			the checksum of the injector adjustment code value is plausible	=	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.
											predrive with 1 s rate	
O2 Sensor Circuit Range/Performance Bank 1 Sensor 1	P2A00	Monitoring the measured A/F sensor voltage for higher than expected values, indicating an OOR high failure	filtered A/F sensor voltage	>=	4.70	V	modeled exhaust-gas pressure	<	250.00	kPa	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
							The calibration scheduler has requested a calibration sequence during signal acquisition	=	TRUE	-		
							A/F sensor temperature (based on sensor internal resistance)	>=	804.96	°C		
							and					
							Status bit for valid A/F sensor inner Resistance (see parameter definition table)	=	TRUE	-		
							and					
							A/F sensor error status bit (see parameter definition table)	=	FALSE	-		
							and					
							Temperature of lambda sensor	<	823.96	°C		
							and			°C		
							Temperature of lambda sensor	>	805.96	°C		
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Delivery Performance monitor	P2BAA	Compared EWMA filtered pressure drop with the threshold	EWMA filtered pressure drop	<	365.00	kPa					fault exists for more than 1 event; monitor runs at 0.1 s once	A
							Modeled SCR catalyst temperature	>=	199.96	°C		
							Modeled SCR catalyst temperature	<=	399.96	°C		
							Temperature gradient of SCR	>=	-40.00	°C/sec		
							Temperature gradient of SCR	<=	40.00	°C/sec		
							for time	>	0.20	sec		
							Exhaust mass flow	>	5.00	g/sec		
							Exhaust mass flow	<=	63.89	g/sec		
							(a) - (b)	>	-0.30	g		
							(a) Desired NH3 load level	=	calculated parameter	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) estimated NH3 load level	=	calculated parameter	-		
					Estimated NH3 load level	<	3.00	g		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					DPF Regen not active	=	TRUE	-		
					Reductant dosing off request	=	FALSE	-		
					SCR control sub state (please see the definition)	=	COSCR_METERINGCONTROL			
					Dosed reductant amount of current driving cycle	>=	7.00	g		
					Dosed reductant amount of current driving cycle	<=	100.00	g		
					Dwell time in Metering control substate	<=	42949672.95	sec		
					amplitude of SCR pressure signal	>=	0.00	kPa		
					amplitude of SCR pressure signal	<=	100.00	kPa		
					State of Reductant injection valve Component Protection (please see definition)	=				
					vehicle acceleration	<	2.00	m/sec^2		
					for time	>	3.00	sec		
					NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					basic enable conditions met:	=	see sheet enable tables	-		
					EWMA fast initialization mode:					
					EWMA filter coefficient for Fast Initialization mode	=	0.28	factor		
					Maximum number of pressure drop per driving cycle in Fast Initialization mode	>=	3.00	counts		
					Total number of pressure drop for Fast Initialization mode	=	4.00	counts		
					EWMA Rapid Response mode:					
					Pressure difference: (a) - (b)	>	-12.00	kPa		
					(a) measured pressure drop	=	measured parameter	-		
					(b) EWMA filtered pressure drop	=	calculated parameter	-		
					EWMA filter coefficient for Response to Step Change mode	=	0.20	factor		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Maximum number of pressure drop per driving cycle in Response to Step Change mode	>=	3.00	count		
							Total number of pressure drop measurement for Response to Step Change mode		8.00	count		
							EWMA stabilized mode:					
							EWMA filter coefficient for stabilized mode	=	0.20	factor		
							Total number of pressure drop for stabilized mode	=	1.00	counts		
Control Module Communication Bus "A" Off	U0073	ECM CAN Bus A off monitoring	CAN A Bus-Off reported by CAN hardware	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 5 s. test performed continuously	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Control Module Communication Bus "B" Off	U0074	ECM CAN Bus B off monitoring (sensor CAN network)	CAN B Bus-Off reported by CAN hardware	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 5 s. test performed continuously	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
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	>	0.60	sec	ignition on	=	TRUE	-	fail conditions exists for 10 s test performed continuously 0.01 s rate	B
							for time	>=	3.00	sec		
							and					
							battery voltage	>=	9.00	V		
							and					
							battery voltage	<=	655.34	V		
							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.
Lost Communications with Glow Plug Control Module	U0106	Detects loss of communication between ECM (on-board control unit) and GPCM (Glow Plug Control Module)	time since last message from glow plug control module was received	>	0.25	sec	ignition on	=	TRUE	-	fail conditions exists for 10 s test performed continuously 0.02 s rate	B
							for time	>=	3.00	sec		
							and battery voltage	>=	9.00	V		
							and battery voltage	<=	655.34	V		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Lost Communications with Fuel Pump Control Module	U0109	Detects loss of communication between ECM (on-board control unit) and Fuel Pump Control Module	time since last message from fuel pump control module was received	>	0.50	sec	ignition on	=	TRUE	-	fail conditions exists for 10 s test performed continuously 0.1 s rate	B
							for time	>=	3.00	sec		
							and battery voltage	>=	9.00	V		
							and battery voltage	<=	655.34	V		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit 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					

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	<	655.34	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	<	655.34	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	<	655.34	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:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	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.
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	=	TRUE	-	fail conditions exists for more than 20 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	<	655.34	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	4.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx concentration	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	<	655.34	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	4.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx sensor status	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	<	655.34	V		
							battery voltage	>	9.00	V		
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	
							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	=	TRUE	-	rate	
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	4.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx sensor error status	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	<	655.34	V		
							battery voltage	>	9.00	V		
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	<	655.34	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 sensor oxygen concentration	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	<	655.34	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.
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	<	655.34	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 sensor heater resistance	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	<	655.34	V		
							battery voltage	>	9.00	V		
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	>	12.00	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	<	655.34	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	A

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 0.005 s rate	
					consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5.00 sec		
					battery voltage	< 655.34 V		
					battery voltage	> 9.00 V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>= 4.00 counts	CAN Bus is Active	= TRUE -	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx concentration	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	< 655.34 V		
					battery voltage	> 9.00 V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>= 4.00 counts	CAN Bus is Active	= TRUE -	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx sensor status	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	< 5.00 sec		
					battery voltage	> 655.34 V		
						9.00 V		
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	< 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.
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	4.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx sensor error status	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	<	655.34	V		
							battery voltage	>	9.00	V		
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	<	655.34	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 sensor oxygen concentration	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	<	655.34	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.
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	<	655.34	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 sensor heater resistance	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	<	655.34	V		
							battery voltage	>	9.00	V		
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	>	12.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 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	<	655.34	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.
Lost Communication With PM Sensor	U02A3	PM Sensor Control Unit (SCU) CAN communication: SCU signal not received; SCU detects missing CAN-communication or SCU ready-signal not received	SCU sensor signal timeout (no message received)	=	TRUE	-	Battery voltage (ECM)	>=	11.00	V	fault exists for more than 1.4 sec; monitor runs at 0.1 s when enable conditions are met	B
			OR				Ignition on	=	TRUE	-		
			SCU detects missing CAN-communication (i.e. no signal received by SCU but SCU still sends a signal)	=	TRUE	-	for time	>	1.20	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Particulate Matter Sensor Circuit	P24AE	Range check on IDE-supply voltage for higher and lower threshold (short to ground, short to battery plus) and range check on IDE-supply voltage for higher threshold (IDE+ short to battery plus)	**Path 1:**				Ignition on	=	TRUE	-	fault exists for more than 0.1 sec; monitor runs at 0.1 s when enable conditions are met	B
			IDE supply voltage is on	=	TRUE	-	for time		3.00	sec		
			and				Battery voltage (ECM)	>=	11.00	V		
			IDE supply voltage	>=	49.72	V	Battery voltage (ECM)	<=	6553.40	V		
			or				Battery voltage (SCU)	>	9.00	V		
			IDE supply voltage	<=	41.55	V						
			or									
			Path 2:									
			(									
			IDE supply voltage is on	=	FALSE	-						
			and									
			IDE supply voltage	>=	2.00	V						
			)									
			or									
			Path 3:									
			IDE supply voltage is on	=	TRUE	-						
			and									
			ADC voltage for IDE current (SCU internal value)	<	0.3	V						
			or									
			Path 4:									
			ADC voltage for IDE current (SCU internal value)	>=	4.70	V						
		Comparison IDE-current at high temperature (when sensor regeneration occurs) with threshold (detected failures: open circuit IDE+, short to ground IDE-, open circuit IDE-, IDE removed)	Measured IDE-current @ 785°C sensor temperature	<	2.00	μA	Functional IDE self diagnosis is tested	=	TRUE	-	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	
			OR				means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Measured IDE current change (when temperature changed from higher temperature to lower temperature)	<	0.094	µA	(					
							PM Sensor temperature (for absolute current threshold)	>	770.00	°C		
							and					
							PM Sensor temperature (for absolute current threshold)	<	800.00	°C		
							Battery voltage (ECM)	>=	11.00	V		
							)					
							Sensor regeneration is active	=	TRUE	-		
							with					
							PM Sensor temperature (for change in temperature)	>	770.00	°C		
							and					
							PM Sensor temperature (for change in temperature)	<	800.00	°C		
							PM Sensor temperature (for change in temperature)	>	580.00	°C		
							and					
							PM Sensor temperature (for change in temperature)	<	670.00	°C		
Particulate Matter Sensor Circuit High	P24B1	Negative Interdigtal Electrode (IDE) electric fault when supply voltage is off (Range check high)	measured ADC (analog to digital converter) voltage for IDE current (SCU internal value)	>=	4.10	V	Particulate sensor is in the "standby" state	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			for time	>=	2.00	sec	means					
							Particulate sensor is not in the "measure" or "regeneration" state	=	TRUE	-		
							Battery voltage (ECM)	>=	11.00	V		
							Battery voltage (ECM)	<=	6553.40	V		
							Supply voltage is off	=	TRUE	-		
							Ignition on	=	TRUE	-		
							for time	>	3.00	sec		
		Range check high when IDE-supply voltage is on during PM-measurement. Note: A sucessive sensor regeneration is needed to check whether the current has been caused by soot on the IDE.	measured ADC (analog to digital converter) voltage for IDE current (SCU internal value)	>=	4.10	V	Particulate sensor is in the "measurement" state when failure occurs	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	
			for time	>=	2.00	sec	Particulate sensor plausibility check is terminated	=	TRUE	-		
							means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							One sucessful sensor-Regeneration is completed	=	TRUE	-		
							Battery voltage (ECM)	>=	11.00	V		
							Supply voltage is on	=	TRUE	-		
							Ignition on	=	TRUE	-		
							for time	>	3.00	sec		
Particulate Matter Sensor Heater Control Circuit/Open	P24B3	Heater voltage check in the state "heater on" (as detected by µC-in-port)	Electrical error of the heater self diagnosis of the particulate sensor is detected in the state "heater on"	=	TRUE	-	Battery voltage (ECM)	>=	11.00	V	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			means				Heater on	=	TRUE	-		
			Heater voltage (detected by µC-digital-in-port)	<	3.00	V	with					
							Heater duty cycle	>	0.00	%		
							Ignition on	=	TRUE	-		
							for time	>	3.00	sec		
Particulate Matter Sensor Heater Control Circuit High	P24B6	PM Sensor heater voltage (as detected by µC-in-port) and heater current check in the state "heater off"	Electrical error of the heater self diagnosis of the particulate sensor is detected in the state "heater off"	=	TRUE	-	Battery voltage (ECM)	>=	11.00	V	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			means				Heater off	=	TRUE	-		
			(				with					
			Heater voltage (detected by µC-digital-in-port)	>	7.00	V	Heater duty cycle	<=	0.00	%		
			OR				Ignition on	=	TRUE	-		
			Heater current	>	0.20	A	for time	>	3.00	sec		
Particulate Matter Sensor Temperature Circuit	P24C6	Range check of meander temperature raw signal: comparison voltage of meander temperature signal with maximum and minimum threshold	Voltage of PM sensor temperature signal	>	3.00	V	Ignition on	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			or				for time	>	3.00	sec		
			Voltage of PM sensor temperature signal	<	0.30	V	Battery voltage (ECM)	>=	11.00	V		
			or				Exhaust gas temperature	>=	-40.04	°C		
			Temperature as measured by PM sensor temeprature	>	920.00	°C	and					
							Exhaust gas 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.
Particulate Matter Sensor Temperature Circuit Range/Performance	P24C7	The PM Sensor temperature sensor is monitored for temeprature deviations compared to a modeled exhaust temperature.	difference of the measured PM sensor temperature and the modeled exhaust gas temperature (see Look-Up-Table #2)	>	69.96 to 194.96	°C	Sensor in a measurement phase	=	TRUE	-	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	B
			or				with					
			difference of the measured PM sensor temperature and the modeled exhaust gas temperature (see Look-Up-Table #1)	<	-155.04 to -30.04	°C	Time after the end of sensor regeneration	>	180	sec		
							vehicle speed	>=	15.54	mph		
							and					
							vehicle speed	<=	155.38	mph		
							Barometric pressure	>	75.00	kPa		
							Engine running (please see the definition)	=	TRUE	-		
							exhaust model temperature at PM sensor	>	-40.04	°C		
							and					
							exhaust model temperature at PM sensor	<	399.96	°C		
							(					
							|(a) - (b)|	<=	29.96	°C		
							for time since stationary modeled temperature in the driving mode is detected	>=	90	sec		
							with					
							(a) exhaust gas temperature model	=	calculated parameter	-		
							and with					
							(b) frozen exhaust gas model temperature value at beginning of enable conidition release	=	calculated parameter	-		
							)					
		Plausibility check of PM sensor temperature value upon start-up after a calibrated soaking time:	difference of the measured PM sensor temperature at start and the average value of the reference exhaust gas temperature sensors	>	45.46	°C	PM sensor start temperature available	=	TRUE	-	fault exists for more than 0.1 sec; monitor runs at 0.1 s once per trip	
		stuck high check (temperature cross check of PM temperature with 3 reference sensors after cold start)										
			where reference temperatures				means					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) DOC upstream temperature	=	measured parameter	-	Raw value of start temperature of particulate sensor	>=	-40.00	°C		
			(b) DOC downstream temperature	=	measured parameter	-	Particulate sensor can be reached via CAN	=	TRUE	-		
			(c) SCR upstream temperature	=	measured parameter	-	Barometric pressure	>	75.00	kPa		
							Cold start detection	=	TRUE	-		
							means					
							(					
							Engine ECU shut-off time is reported as valid (see P2505 or P2610 for details on ECU / Engine-Off Time	=	TRUE	-		
							Shut-off time of the particulate sensor control unit	>	21600	sec		
							)					
							Temperature range check of the reference sensors is set	=	TRUE	-		
							means					
							(					
							Temperature before Oxi-Catalyst	>=	-40.04	°C		
							and					
							Temperature before Oxi-Catalyst	<=	79.96	°C		
							Temperature before particulate filter	>=	-40.04	°C		
							and					
							Temperature before particulate filter	<=	79.96	°C		
							Temperature before SCR-Catalyst	>=	-40.04	°C		
							and					
							Temperature before SCR-Catalyst	<=	79.96	°C		
							)					
Particulate Matter Sensor Supply Voltage Circuit Low	P24D0	PM Sensor Sensor Control Unit (SCU) battery supply plausibility check which compares the difference in voltages as measured by ECM and SCU with threshold	**Path 1:**				Ignition on	=	TRUE	-	fault exists for more than 1.5 sec; monitor runs at 0.1 s when enable conditions are met	B
			Battery voltage (ECM)	>	15.00	V	for time	>	3.00	sec		
			and				Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
			difference of SCU voltage and ECM measured voltage	>	1.10	V	Sensor is in the state "ready"	=	TRUE	-		
			or				means					
			difference of ECM measured voltage and SCU voltage	>	3.00	V	Battery voltage (ECM)	>=	11.00	V		
							Battery voltage (ECM)	<=	6553.40	V		
			or									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Path 2:									
			Battery voltage (ECM)	<	11.70	V						
			and									
			difference of SCU voltage and ECM measured voltage	>	3.00	V						
			or									
			difference of ECM measured voltage and SCU voltage	>	1.90	V						
			or									
			Path 3:									
			Battery voltage (ECM)	>=	11.70	V						
			and									
			Battery voltage (ECM)	<=	15.00	V						
			and									
			difference of SCU voltage and ECM measured voltage	>	2.10	V						
			or									
			difference of ECM measured voltage and SCU voltage	>	2.60	V						
		Plausibility check of the PM Sensor Sensor Control Unit (SCU) battery supply during sensor regeneration: comparison the difference in voltages as measured by ECU and SCU with voltage dependent threshold	**Path 1:**				Ignition on	=	TRUE	-	fault exists for more than 1.5 sec; monitor runs at 0.1 s when enable conditions are met	
			Battery voltage (ECM)	>	15.00	V	for time	=	3.00	sec		
			and				Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
			difference of SCU voltage and ECM measured voltage	>	1.10	V	Sensor is in the state "ready"	=	TRUE	-		
			or				means					
			difference of ECM measured voltage and SCU voltage	>	3.00	V	Battery voltage (ECM)	=	11.00	V		
							Battery voltage (ECM)	<=	6553.40	V		
			or				Heater duty cycle of PM Sensor	>	23.00	%		
			Path 2:									
			Battery voltage (ECM)	>	11.70	V						
			and									
			difference of SCU voltage and ECM measured voltage	>	3.00	V						
			or									
			difference of ECM measured voltage and SCU voltage	>	1.90	V						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			or							
			Path 3:							
			Battery voltage (ECM)	>=	11.70	V				
			and							
			Battery voltage (ECM)	<=	15.00	V				
			and							
			difference of SCU voltage and ECM measured voltage	>	2.10	V				
			or							
			difference of ECM measured voltage and SCU voltage	>	2.60	V				

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
ECM Operating States		Engine Pre-Drive	processor operating normally	=	TRUE	-
			ignition on	=	FALSE	-
			processor powerup boot initialization	=	complete	-
			or			
			key off bookkeeping cleanup	=	complete	-
			(accessory, post-wake-up, pre-sleep)			
		Engine Running (see Look-Up table #81)	ignition on	=	TRUE	-
			engine speed	>=	200.00	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 on	=	FALSE	-
			key off bookkeeping cleanup	=	in process	-
Engine Operating Modes	Exhaust Operating Mode	Normal Mode				
		Particulate Filter Regeneration Mode				
		Particulate Filter Regen Service Mode				
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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions
			Long Idle Transmission Gear Shift Cold Start extreme temperature or pressure Critical Regeneration Modes	
			Overrun	
			Gear Shifting	
			Overlong Idle	
			permanent control deviation	
			Demand of the drift compensation	
			System error	
			Error exhaust gas recirculation valve	
			Error throttle valve	
			Engine Brake Status	
			Atmospheric pressure too low	
			Battery voltage too low	
			Switch-off coordinator	
			Environmental temperature too low	
			Environmental temperature too high	
			Engine temperature too low	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions
			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 14OBDG04	Defined by:	Enable Conditions		
			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	>=	4.00	counts
Fuel System		Fuel System is in Fuel Shut Off also known as Decel Fuel Shut Off or Over-Run	engine running	=	TRUE	-
			required actual engine torque	<	1.00	Nm
		Status of Diesel Fuel Refill Detection	((			
			Filtered total fuel volume available	>	(a) + (b)	-
			with			
			(a) Amount of fuel volume change that indicates a refueling event occurred	=	25.26	%
			and			
			(b) captured remaining diesel fuel volume under the following conditions	=	measured parameter	-
			(			
			Vehicle speed	<=	1.24	mph
			for time	>	4.00	sec
			)			
			and			
			(			
			Vehicle speed	<=	1.24	mph
			for time	>	30.00	sec
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			or at initialization of Diesel fuel level	=	TRUE	-
	Rail Pressure Control - 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	<=	400.00	rpm
			and (rail pressure	>=	50000	kPa
			or (a) - (b)	<	1000	kPa
			and with (a)Fuel Rail Pressure Setpoint	=	measured parameter	-
			and (b)Maximum Rail Pressure for last 10ms	=	measured parameter	-
			)			
		Rail Control - PCV Closed Loop Control Only	(Rail Pressure Precontrol (Just after start)	=	TRUE	-
		PCV = Pressure Control Valve	and Number of Crankshaft revolutions since entering Rail Pressure Precontrol	>=	10.00	revs

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			) 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 #7)) or (	>	20000 to 33080	mm3/sec
			Fuel system pressure and high pressure pump outlet	<	0.00	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	-
			and			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(a) + (b) (see Look-Up-Table #8)	<	9 to 26	mm^3/rev
			and with			
			(a)Torque Generating fuel injection quantity	=	calculated parameter	-
			and			
			(b)Non-Torque generating fuel injection quantity	=	calculated parameter	-
		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	=	TRUE	-
			or			
			state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			)			
			and			
			(a) + (b)	<	(c) + (d)	-
			(a)Torque Generating fuel injection quantity	=	calculated parameter	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parameter	-
			(c) (see Look-Up-Table #8)	=	9 to 26	mm^3/rev
			(d)	=	2.00	mm^3/rev
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(			
			state machine rail pressure control equal to metering unit control mode	=	TRUE	-
			or			
			state machine rail pressure control equal transitioning to metering unit pressure control mode	=	TRUE	-
			)			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			(			
			Fuel system pressure and high pressure pump outlet	<	0.00	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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			or			
			state machine rail pressure control equal transitioning to metering unit pressure control mode	=	TRUE	-
			)			
			and			
			(			
			(			
			exhaust gas system regeneration mode	!=	REGEN	-
			)			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Switchover Between Metering Unit + PCV Closed Loop Control to PCV Closed Loop Control only	(			
			state machine rail pressure control equals coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or			
			state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			)			
			and			
			(a) + (b) (see Look-Up-Table #8)	<	9 to 26	mm^3/rev

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			with			
			(a)Torque Generating fuel injection quantity	=	calculated parameter	-
			and			
			(b)Non-Torque generating fuel injection quantity	=	calculated parameter	-
Idle Speed Control		Idle Speed Controller Active "normal" low idle speed governor	no overrides for: Gear-Shift Harmonization Intrusive Diagnosis Action			
A/F Sensor	A/F sensor error status bit	A/F SPI communication error	A/F SPI communication error	=	TRUE	-
		A/F Sensor heater powerstage error	HO2S Heater Control Circuit Bank 1 Sensor 1 Circuit High	=	TRUE	-
			or			
			HO2S Heater Control Circuit Bank 1 Sensor 1 Circuit Low	=	TRUE	-
			or			
			HO2S Heater Control Circuit Bank 1 Sensor 1 Circuit	=	TRUE	-
		A/F sensor short circuit to battery of sensor lines or A/F sensor short circuit to ground of sensor lines error detected	A/F sensor short circuit to battery of sensor lines	=	TRUE	-
			or			
			A/F sensor short circuit to ground of sensor lines	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
		Open load detected at sensor lines UN (A/F sensor nernst cell) or VG (A/F sensor virtual ground)	A/F Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	=	TRUE	-
			or			
			A/F Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	=	TRUE	-
		A/F sensor signal range check error	A/F sensor Circuit Range/Performance Bank 1 Sensor 1	=	TRUE	-
		A/F signal calibration error	A/F sensor calibration resistor circuit output high	=	TRUE	-
			or			
			A/F sensor calibration resistor circuit output low	=	TRUE	-
		A/F sensor calibration error of resistance signal	A/F sensor calibration resistance max	=	TRUE	-
			or			
			A/F sensor calibration resistance min	=	TRUE	-
		A/F sensor heater control deviation error	A/F sensor Heater Resistance Bank1 Sensor 1 high	=	TRUE	-
			or			
			A/f sensor Heater Resistance Bank1 Sensor 1 low	=	TRUE	-
		A/F sensor open load at input pump current line	A/F Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	=	TRUE	-
		A/F sensor plausibility error at different engine conditions	A/F Sensor Performance - Signal High during Deceleration Bank 1 Sensor 1	=	TRUE	-
			or			
			O2 Sensor Performance - Signal low during Deceleration Bank 1 Sensor 1	=	TRUE	-
			or			
			O2 Sensor Performance - Signal High during Moderate Load Sensor 1	=	TRUE	-
			or			
			A/F Sensor Performance - Signal Low during Moderate Load Bank 1 Sensor 1	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
		A/F sensor dynamic error	A/F Sensor Circuit Slow Response Bank 1 Sensor 1	=	TRUE	-
	Status bit for valid A/F sensor inner Resistance	Status bit for valid A/F sensor inner Resistance				
			No Permanent wire errors are present (Short circuit to battery, short circuit to ground and open load)	=	TRUE	-
			No permanent Resistance calibration value error	=	TRUE	-
			No Errors in CJ125 SPI communication and no low battery voltage detected by CJ125	=	TRUE	-
	Dewpoint Detection	A/F Sensor Dewpoint Reached	Integrated heat quantity (see Look-Up-Table #1)	>=	130 to 600	kJ
			and			
			NO Pending or Confirmed DTCs: (related to A/F sensor heater circuit or A/F sensor circuit used for sensor internal resistance calculation)	=	see sheet inhibit tables	-
Upstream NOx Sensor		Status of NOx signal of upstream NOx sensor				
			(			
			following condition met for time:	>	30.00	sec
			(			
			Integrated heat quantity (see Look-Up-Table #1)	>=	130 to 600	kJ

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			NOx status signal received via CAN message (Please see the definition)	=	TRUE	-
			for time	>	1	sec
			calculated lambda value based on air mass flow and injection quantity	>	0.90	-
			for time	>	2	sec
			engine speed	>	200.00	rpm
			for time	>	20.00	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Upstream NOx sensor dewpoint achieved	Integrated heat quantity (see Look-Up-Table #1)	>=	130 to 600	kJ
Downstream NOx Sensor		Status of NOx signal of downstream NOx sensor				
			(			
			following condition met for time:	>	30.00	sec
			(			
			Integrated heat quantity (see Look-Up-Table #3)	>=	310 to 1460	kJ
			NOx status signal received via CAN message (Please see the definition)	=	TRUE	-
			for time	>	1	sec
			calculated lambda value based on air mass flow and injection quantity	>	0.90	-
			for time	>	2	sec
			engine speed	>	200.00	rpm
			for time	>	20.00	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			))			
		Downstream NOx sensor dewpoint achieved	Integrated heat quantity (see Look-Up-Table #3)	>=	310 to 1460	kJ
		Enabling Downstream NOx sensor heater diagnosis	(			
			SCR Catalyst downstream temperature	>=	99.96	°C
			SCR Catalyst downstream temperature	<=	599.96	°C
			battery voltage	>=	11.00	V
			battery voltage	<=	655.34	V
			and			
			Integrated heat quantity (see Look-Up-Table #3)	>=	310 to 1460	kJ
			for time	>	30.00	sec
			)			
			and			
			for time	>	0.5	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
PM Sensor		PM sensor dewpoint achieved	Integrated heat quantity (see Look-Up-Table #3)	>=	310 to 1460	kJ

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
Regeneration of the Diesel Particulate Filter		Status thermal regeneration active				
			Reduced particle mass flow in simulation by thermal regeneration			
			(a) * (b) * (c)	>	0	-
			with			
			(a) Correction factor for thermal soot burn-out dependent on lambda and oxygen mass flow (see Look-Up-Table #5)	=	0 to 1.619995	factor
			(b) Effect of temperature on regenerated particle mass (see Look-Up-Table #6)	=	0 to 0.949951	-
			(c) Basis value of produced soot mass flow dependent on actual soot mass (see Look-Up-Table #4)	=	0.013 to 0.054	g/sec
SCR System	NOx Control System Reductant Dosing Strategy Active State	Release of dosing of the dosing strategy				
			status of SCR control state (please see the definition)	=	Metering Control	-
			Reductant dosing is released	=	TRUE	-
			Deactivation of dosing to execute the NOx Offset test (Please see the definition)	=	FALSE	-
			since start for time	>=	0.00	sec
			gradient of exhaust gas temperature	<=	-100	°C/sec
			since start for time	>=	42949672.95	sec
			Average temperature inside the SCR catalyst:	>	159.96	°C
			SCR catalyst wall temperature	>	3003.56	°C
			Vehicle speed	>=	203.648228713487	mph
			engine speed	>	550.00	rpm

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
	NOx Control System Reductant Dosing Pressure Control System States	State of Reductant Pressure Control System: Standby	ignition	=	on	-
			Dwell time in the state of standby	<	2.10	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	>=	2.10	sec
			Dwell time in the state of no pressure control	<	2.00	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	>	600.00	rpm
			Dwell time in the state of no pressure control	>=	2.00	sec
			exhaust gas temperature Upstream SCR	>=	179.96	°C
			(			
			Reductant Defrost check (please see the definition)	=	TRUE	-
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			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	<	70.00	%
			and			
			Reductant Pump Module Pressure	<	95.00	kPa
			)			
			Set-point duty cycle for Reductant dosing valve	=	100.00	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	60.00	%
			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	-
			(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			Reductant filling state in the pressure line	>=	70.00	%
			or			
			Reductant Pump Module Pressure	>=	95.00	kPa
			for time	>	0.50	sec
			)			
			Reductant Pump Module Pressure	<	375.00	kPa
			Set-point duty cycle for Reductant dosing valve	=	0%	%
			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: Ventilation (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			Reductant Pump Module Pressure	<	375.00	kPa
			Dwell time in Pressure Build up substate	>	15.00	sec
			system pressurizes in pressure buildup and ventilation states	<	10.00	counts
			Set-point duty cycle for Reductant dosing valve	=	0.00	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	40.00	%
			Dwell time in the sub state ventilation	<	0.30	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
		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	>=	375.00	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	<	20.00	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	=	0.00	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
	SCR Engine State required for operation	SCR Engine State	Ignition	=	TRUE	-
			engine speed	>	600.00	rpm
	Reductant Dosing Strategy based on DPF load	Status fill level decrease (please see the definition)				
			Particulate Filter Regeneration demand on	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:			Enable Conditions
			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	=	calculated parameter	-
			(c) Reductant Dosing quantity limitation	=	0.90	factor
			or SCR catalyst temperature too high to convert Reductant under Particle filter Regeneration request Average temperature inside the SCR catalyst:	>	3003.56	°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	<=	600.00	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			ambient temperature	>	-7.14	°C
			Release heater pressure line	=	FALSE	-
			and			
			duration, for which the conditions for a hydraulic release reset of supply module heater circuit are satisfied	<=	600.00	sec
			ambient temperature	>	-7.14	°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	>	-8.04	°C
			or			
			Engine off Time	>	2147483647.00	sec
			Reductant tank heat temperature at Standby state	>	3003.56	°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 2200	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	>	600.00	rpm

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(			
			Pressure line defrost check in last driving cycle	=	TRUE	-
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Engine off Time (see Look-Up-Table #21)	<	120 to 900	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 2200	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	>	600.00	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 (see Look-Up-Table #20)	<	120 to 900	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)	>=	32767	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			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	>	600.00	rpm
			Engine off Time	<=	0.00	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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			engine speed	>	600.00	rpm
			Engine off Time	<=	0.00	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 #24)	>=	10 to 4170	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 300	sec
			)			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #24)	>=	10 to 4170	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 300	sec
			)			
			and			
			(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 2200	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #22)	>=	0 to 180	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #24)	>=	10 to 4170	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 300	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 2200	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	sec
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #24)	>=	10 to 4170	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 300	sec
			)			
			and			
			(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 2200	sec
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			Requested heating time for pressure line heater (see Look-Up-Table #22)	>=	0 to 180	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 2200	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	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 2200	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #22)	>=	0 to 180	sec
			)			
			or			
			((			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 2200	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #22)	>=	0 to 180	sec
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			and (			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 2200	sec
			or Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	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 2200	sec
			or Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	sec
			)			
			or ((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #24)	>=	10 to 4170	sec
			or Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 300	sec
			) and			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 2200	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	sec
			))			
			or			
			((			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 2200	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #22)	>=	0 to 180	sec
			)			
			and			
			(			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 2200	sec
			or			
			Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	sec
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #24)	>=	10 to 4170	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 300	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:				Enable Conditions
			)				
			and				
			(				
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 2200	sec	
			or				
			Requested heating time for pressure line heater (see Look-Up-Table #22)	>=	0 to 180	sec	
			)				
			and				
			(				
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 2200	sec	
			or				
			Requested heating time for supply module heater (see Look-Up-Table #23)	>=	0 to 180	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	<	655.34	V	
			battery voltage	>	11.00	V	
			for time	>	2.00	sec	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
		Status of the battery voltage being in the valid working range for pressure line heater				
			battery voltage	<	655.34	V
			battery voltage	>	11.00	V
			for time	>	2.00	sec
		Status of Reductant Tank Heater Release				
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			)			
			or			
			((			
			Waiting time before tank heater released	<	32767.00	sec
			started with			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			)			
			and			
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			or ((Waiting time before tank heater released	>	32767.00	sec
			started with status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			) and (status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired))	>	0.00	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	>=	8.00	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			ignition	=	on	-
			engine speed	>	600.00	rpm
			Vehicle speed	>=	6.22	mph
			time since engine started	<=	(a) * (b)	
			(a) Time period for a positive slope to detect refueling	=	8.00	sec
			(b) Factor for the extension of the detection time for refueling	=	3.00	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	>=	4.00	sec
			and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/s
			filter release for Reductant tank level calculation at T15 on (Please see the definition)	=	TRUE	-
			and with			
			(			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
			and with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(			
			Reductant tank Temperature	>=	-100.04	°C
			or			
			Reductant low warning level (Please see the definition)	>=	0.00	level
			)))			
		Status of Reductant Tank Level Release	status of reductant tank level release (please see the definition)			
			Status of Filter release for reductant tank level calculation (please see the definition)	=	TRUE	-
			and			
			((			
			ambient temperature	>=	-100.04	°C
			((			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			Waiting time before tank heater released	<	32767.00	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	>=	32767.00	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>=	0.00	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 T15 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)	>=	0.00	-
			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	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			Engine on timer is expired (please see the definition)	=	False	
			Vehicle speed	>=	0.62	mph
			Reductant low warning level (Please see the definition)	>=	49.00	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]	=	1870.00	g
			(b) Tank level threshold range below Restriction threshold for T15 refill detection release	=	0.00	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]	=	5060.00	g
			(b) Tank level threshold range below WARNING threshold for T15 refill detection release	=	0.00	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]	=	5060.00	g

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(b) Tank level threshold range below WARNING threshold for T15 refill detection release))	=	0.00	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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			)			
			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
			(a) calibrated rise timer		12	sec
			(b) factor		20	-
			and with			
			((			
			ignition	=	on	-
			engine speed	>	600.00	rpm
			Vehicle speed	>=	6.22	mph
			)			
			or			
			(			
			Vehicle speed	>=	6.22	mph
			NO Pending or Confirmed DTCs:	=	TRUE	-
			for time	>	1.00	sec
			))			
			and with timer reset conditions			
			(			
			Falling edge of ignition	=	TRUE	-
			or			
			Reductant Refill enabling conditions reset timers	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			)			
	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	<=	98.18	mph
			))			
			or			
			Reductant Quality state	>	0	-
		Warning_Leve1: 1 decimal, Warning level 1	Reductant tank level	<	Full	-
			Remaining mileage	>	1500.00	miles
			and with			
			(			
			Warning level	<=	49	Warning level in decimal
			or			
			(			
			Previous warning level	>	49	Warning level in decimal
			vehicle speed	<=	98.18	mph
			))			
			and with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			Reductant Quality state	=	0	-
		Warning_Level2: 2 decimal, Warning level 2	Reductant tank level	<	Full	-
			Remaining mileage and with (	<=	1500.00	miles
			Warning level	<=	49	Warning level in decimal
			or (Previous warning level	>	49	Warning level in decimal
			vehicle speed)) and with	<=	98.18	mph
			Reductant Quality state	=	0	-
		Warning_Level3: 16 decimal, Warning level 3	Reductant tank level	<	Full	-
			Remaining mileage and with (	>	800.00	miles
			Warning level	=	2	Warning level in decimal
			or Warning level	=	16	Warning level in decimal
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			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	<=	800.00	miles
			and with			
			(			
			Warning level	<=	49	Warning level in decimal
			or			
			(			
			Previous warning level	>	49	Warning level in decimal
			vehicle speed	<=	98.18	mph
			))			
			and with			
			Reductant Quality state	=	0	-
		Warning_Level5: 48 decimal, Warning level 5	((			
			Reductant tank level	<	Full	-
			Remaining mileage	<=	575.00	miles
			and with			
			(			
			Warning level	<=	49	Warning level in decimal
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(			
			Previous warning level	>	49	Warning level in decimal
			vehicle speed	<=	98.18	mph
			)))			
			or			
			(			
			Warning level	=	48	Warning level in decimal
			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 in decimal
			initialization phase after Reductant refill event is active	=	TRUE	-
			)			
			or			
			(			
			Warning level	<	49	Warning level in decimal
			Failed Reductant system pressure build up	=	1	-
			))			
			and with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			Reductant Quality state	=	0	-
		Warning_Level8: 80 decimal,Vehicle speed restriction mild	Warning level	=	80	Warning level in decimal
			initialization phase after Reductant refill event is active and with	=	TRUE	-
			Reductant Quality state	=	0	-
		Warning_Level10: 112 decimal,Vehicle speed restriction aggressive	Warning level	=	112	Warning level in decimal
			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 in decimal
			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 in decimal

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			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	>	5.00	sec
			Reductant tank Temperature	<=	-9.04	°C
			Reductant low warning level (Please see the definition)	>=	96.00	level
		Status of Reductant tank as frozen	(			
			Engine off Time	>	14400.00	sec
			Reductant tank Temperature	<	-11.04	°C
			)			
			or			
			(			
			Engine off Time	<=	7200.00	sec
			time since the following conditions are met	<=	7200.00	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	-
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
	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)	>=	64.00	-
			number of pressure build-up attempts	>=	2.00	counts
			and			
			(			
			status of SCR control sub state (please see the definition)	=	Pressure Build up	-
			Reductant Pump Module Pressure	<	375.00	kPa
			Dwell time in Pressure Build up substate	>	15.00	sec
			system pressurizes in pressure buildup and ventilation states	>=	10.00	counts
			Reductant Defrost check (please see the definition)	=	TRUE	-
			)			
SCR System Diagnosis	SCR System Long Term Adaptation Release States	Long-term Adaption Triggered				
			underdosing detected (please see the definition)	=	TRUE	-
			OR			
			overdosing detected (please see the definition)	=	TRUE	-
		Underdosing detected	Difference between the NOx mass of the sensor and of the model during first functional evaluation (see Look-Up-Table #13)	>=	0.4 to 0.45	g
			OR			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			Difference between the NOx mass of the sensor and of the model during second functional evaluation (see Look-Up-Table #14)	>=	0.08 to 0.09	g
			OR			
			Difference between the NOx mass of the sensor and of the model during third functional evaluation (see Look-Up-Table #15)	>=	-0.1 to -0.07	g
		Overdosing detected				
			Difference between the NOx mass of the sensor and of the model during first functional evaluation (see Look-Up-Table #10)	<=	-0.55 to -0.38	g
			OR			
			Difference between the NOx mass of the sensor and of the model during second functional evaluation (see Look-Up-Table #11)	<=	-0.39 to -0.3	g
			OR			
			Difference between the NOx mass of the sensor and of the model during third functional evaluation (see Look-Up-Table #12)	<=	-0.27 to -0.2	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	>	15.00	ppm

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			for time	>	0.50	sec
			Estimated SCR catalyst efficiency	>	0.70	factor
			for time	>	1.00	sec
			NOx concentration deviation between sensor reading and modeled NOx concentration downstream SCR catalyst	>	measured parameter	-
			for time	>	0.50	sec
			(			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	240.00	sec
			or			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	120.00	sec
			Integrated NOx mass since Reductant load level adaptation and plausibility have been locked	>=	1.20	g
			)			
			Difference between nominal and estimated Reductant	<	0.10	g
			Difference between nominal and estimated Reductant	>=	-1.00	g
			Filtered Upstream NOx mass flow	>=	0.00	g/sec
			Filtered Upstream NOx mass flow	<=	0.05	g/sec
			(			
			Upstream NOx mass flow difference : (a) - (b)	>=	-0.05	g/sec
			Upstream NOx mass flow difference : (a) - (b)	<=	0.04	g/sec
			and with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			(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	<	0.05	g
			Difference between nominal and estimated Reductant	>=	-1.00	g
			for time	>	0.20	sec
			HC load in SCR catalyst	<=	1.20	factor
			overall aging factor of the SCR catalyst	>=	0.00	factor
			for time	>	10.00	sec
			Temperature gradient of SCR	>=	-327.68	°C/sec
			Temperature gradient of SCR	<=	327.67	°C/sec
			for time	>	0.20	sec
			Integrated NOx mass flow after engine start	>=	0.00	g
			Release of Reductant dosing	=	active	
			engine operating condition based on engine speed and injection quantity	>	0	factor
			(			
			Difference between nominal and estimated Reductant	>	-0.05	g
			Reductant mass flow (see Look-Up-Table #9)	>	0 to 0.04	g
			Elapsed time of the fill level timer	>	20.00	sec
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
		State of the NH3 (Ammonia) slip detection				
			Reductant concentration downstream SCR	<	30.00	ppm
			and			
			(a) - (b)	<	0.00	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	>	49.96	°C
			SCR catalyst temperature	<	349.96	°C
			time	>	60.00	sec
			and			
			Currently dosed Reductant mass flow	<=	0.05	g/sec
			time	>	300.00	sec
			and			
			Feed ratio			
			(a) / ((b) * (c))	<=	0.10	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	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			for time	>	300.00	sec
			and			
			Estimated current Reductant load	<=	1.30	g
			time	>	30.00	sec
		Release plausibility of Reductant Load	Release plausibility timer active	>=	240.00	sec
			or			
			(			
			Release plausibility timer active	>=	120.00	sec
			Integrated NOx raw emission since fill level adaptation and plausibility have been locked	>=	1.20	g
			)			
		Status for disabling the SCR Efficiency monitor following an SCR Adaptation cycle completion	Maximum dosing quantity	<	0.60	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 14OBDG04	Defined by:	Enable Conditions		
			(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	=	910.17	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	=	0.02	g/sec
			and			
			Engine coolant temperature	<	(a) + (b)	
			(a) Lower hysteresis threshold for engine temperature	=	2999.96	°C
			(b) Offset for lower hysteresis switch on threshold for engine temperature	=	0.00	°C
			Engine coolant temperature	>	3003.56	°C
			and			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:		Enable Conditions	
			ambient pressure	>	(a) + (b)	
			(a) Upper hysteresis threshold for environment pressure	=	74.00	kPa
			(b) Offset for upper hysteresis switch on threshold for environment pressure	=	27.00	kPa
			or			
			ambient pressure	<	73.50	kPa
			and			
			Intake air temperature	>	(a) + (b)	
			(a) Lower hysteresis switch on threshold for inlet air temperature	=	-10.04	°C
			(b) Offset for upper hysteresis switch on threshold for inlet air temperature	=	403.00	°C
			or			
			Intake air temperature	<	-50.04	°C
			)			
			and			
			(			
			ambient temperature	>=	-9.04	°C
			ambient pressure	>=	74.80	kPa
			Selected temperature used for locking pre controlled mode	>=	-3549.94	°C
			Selected temperature used for locking pre controlled mode	<=	369.96	°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	-
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			((			
			(k) + (l) + (m)	>	0.00	
			(k) = (a) * (b)			
			(a) entry condition for pre controlled dosing at sea level	=	0	-
			(b) Altitude multiplier factor for sea level	=	measured parameter	-
			(l) = (c) * (d) * (e)			
			(c) entry condition for online dosing at Mid level	=	0	-
			(d) Multiplier to Mid Level enable speed load map	=	1	factor
			(e) Altitude multiplier factor for medium altitude	=	measured parameter	-
			(m) = (f) * (g) * (h)			
			(f) Entry condition for online dosing at Hi level	=	0	-
			(g) Multiplier to Hi Level enable speed load map	=	1	factor
			(h) Altitude multiplier factor for high altitude	=	measured parameter	-
			)			
			and			
			Low pass filtered upstream NOx sensor signal	>	0	ppm
			)			
	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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
		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	>	60.00	sec
			or	=	TRUE	
			ice detection by tank temperature difference:			
			(a) - (b)	<=	-0.54	°C
			(a) filtered current tank temperature	=	measured parameter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured parameter	-
			))			
			or			
			(a) - (b)	<=	-0.54	°C
			(a) filtered current tank temperature	=	measured parameter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured parameter	-
			or			
			monitoring was performed in previous driving cycle	=	TRUE	-
		continuation of previously started tank temperature performance monitoring cycle	temperature difference: (a) - (b)	<=	1.56	°C
			(a) filtered current tank temperature	=	measured parameter	-
			(b) tank temperature of the previous driving cycle	=	measured parameter	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			temperature difference: (a) - (b)	<=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured parameter	-
			(b) filtered current tank temperature	=	measured parameter	-
			temperature difference: (a) - (b)	>=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured parameter	-
			(b) start tank temperature of current monitoring cycle from EEPROM (see definition)	=	measured parameter	-
			Engine off Time	<=	2000.00	sec
			This monitor was complete in the last driving cycle	=	FALSE	
			ice detection by tank temperature difference:			
			(a) - (b)	>	-0.54	°C
			(a) filtered current tank temperature	=	measured parameter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured parameter	-
		State of Reductant injection valve Component Protection	((			
			status of SCR control sub state (please see the definition)	=	Metering control	-
			and with			
			(			
			PM Filter Regeneration	=	not active	-
			Reluctant dosing valve modeled temperature (see Look-Up-Table #16)	>	119.96 to 134.96	°C
			)			
			or			
			(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 14OBDG04	Defined by:	Enable Conditions		
			PM Filter Regeneration	=	active	-
			Reluctant dosing valve modeled temperature	>	119.96	°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 #16)	>	119.96 to 134.96	°C
			)			
			or			
			(			
			PM Filter Regeneration	=	active	-
			Modeled Reductant injection valve tip temperature based on its coil temperature	>	119.96	°C
			)))			
Turbo Charger		Turbocharger (VNT) wiping active	The Variable Nozzle Turbocharger Control has an intrusive mode where: VNT wiping is a sweep of the vane position control throughout its range of motion which is used to: avoid a binding of the VNT vanes due to soot accumulation during long idle operation with a cold engine.			

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

Injection Qty (mm^3/rev) / Ambient Pressure (kPa)	0	95	110	180	250	300	400	500
2	0.85	0.85	0.85	0.85	0.8	0.8	0.8	0.8
4	0.85	0.85	0.85	0.85	0.8	0.8	0.8	0.8
70	0.85	0.85	0.85	0.85	0.8	0.8	0.8	0.8
80	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
100	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
120	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
140	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
200	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
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	20	20	20

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
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	25	25	25

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
4	P040F	Air_tDiffMaxHiTEGRClr2Ds_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	10000	15000	20000	25000	28800	30000
Delta Temperature (°C)	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	20	20

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

Ambient Pressure (kPa)	70	75	80	85	90	95	100	110
Correction Factor (factor)	0.75	0.75	0.825	0.9	1	1	1	1

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
9	P0401	AirCtl_mEGRMinDvtLim_CUR

Ambient Pressure (kPa)	67	70	73	76	79	82	85	88	91	94	97	100
EGR Commanded Air Mass (g/rev)	0.04	0.04	0.04	0.04	0.045	0.0525	0.0625	0.075	0.085	0.0925	0.0975	0.1

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1000	1200	1750	2000	2500	3000	5000
10	0.033	0.033	0.033	0.033	0.040	0.060	0.075	0.075
20	0.033	0.033	0.033	0.033	0.040	0.060	0.075	0.075

30	0.033	0.033	0.033	0.033	0.040	0.060	0.075	0.075
40	0.033	0.033	0.033	0.033	0.040	0.060	0.075	0.075
60	0.033	0.033	0.033	0.033	0.040	0.060	0.075	0.075
80	0.035	0.035	0.035	0.035	0.040	0.060	0.075	0.075
90	0.040	0.040	0.040	0.040	0.040	0.060	0.075	0.075
100	0.060	0.060	0.060	0.060	0.060	0.060	0.075	0.075

11 **P0401** AirCtl_mMinDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1000	1200	1600	1800	2000	2500	3000
10	-0.040	-0.040	-0.050	-0.050	-0.050	-0.050	-0.075	-0.150
20	-0.040	-0.040	-0.050	-0.050	-0.050	-0.050	-0.075	-0.150
30	-0.040	-0.040	-0.050	-0.050	-0.050	-0.050	-0.075	-0.150
40	-0.040	-0.040	-0.050	-0.050	-0.050	-0.050	-0.075	-0.150
60	-0.050	-0.050	-0.050	-0.050	-0.050	-0.075	-0.075	-0.150
80	-0.053	-0.053	-0.053	-0.053	-0.053	-0.075	-0.075	-0.150
90	-0.075	-0.075	-0.075	-0.075	-0.075	-0.075	-0.075	-0.150
100	-0.150	-0.150	-0.150	-0.150	-0.150	-0.150	-0.150	-0.150

12 **P2138** APP_uSync_CUR

Accel Pedal Voltage (V)	0.500	2.100	2.100
Pedal Deviation (V)	0.120	0.180	0.180

13 **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

14 **P026A** CAClg_dmThresHi_CUR

Vehicle Speed (mph)	24.85	74.56
Air Mass Flow (g/sec)	55.556	277.78

15 **P011B** 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	20	20	20

17 **P0336** EpmCrS_facGapPlausHigh_CA

-	8	5.81	3.38	3.38

18 **P0336** EpmCrS_facIncPlausHigh_CA

-	2	1.81	1.5	1.5

19 **P02CD, P02CF, P02D1, P02D3** ETClb_pRailSet_CA

Rail Pressure Setpoint (kPa)	0	30000	80000

20 **P02CD, P02CF, P02D1, P02D3** ETClb_tiET_MAX_CA

Injector Energizing Time (µsec)	0	547.2	304.4

21 **P02CD, P02CF, P02D1, P02D3** ETClb_tiET_MIN_CA

Injector Energizing Time (µsec)	0	137.2	107.2

22 **P02CD, P02CF, P02D1, P02D3** ETClb_tiETFbOfsMax_CA

Injector Energizing Time (µsec)	0	16	12

23 **P02CD, P02CF, P02D1, P02D3** ETClb_tiETFbOfsMin_CA

Injector Energizing Time (µsec)	0	16	12

24 **P144E** ETCtl_stPOpCtVOLopMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	850	1000	2000	3500
10	0	0	0	0
16	0	1	1	1
40	1	1	1	1
160	1	1	1	1

25 **P144F** ETCtl_stPOpCtVOLopMin_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	900	1000	2000	3500
10	0	0	0	0

16	0	1	1	1
40	1	1	1	1
160	1	1	1	1

26 **P2453** Exh_dpMinPosPPFltDiff_CUR

Exhaust Gas Volume Flow Change (m^3/h/sec)	100	500
Differential Pressure Change Threshold (kPa/sec)	0.5	1.5

27 **P11DC** Exh_facLamStatNoCat2Ds_CUR

-	1	1.5	2	5	7	9	10	15	20	25	30
-	0	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

28 **P11DB** Exh_facLamStatNSCDs_CUR

-	1	1.5	2	5	7	9	10	15	20	25	30
-	0	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

30 **P11D3, P11D4** Exh_mAirAdapActvNSCDs_CUR

Upstream Measure NOx at DFCO Start (ppm)	0	20	50	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600
Integrated Air Mass Flow (g)	100	100	125	150	250	300	300	350	350	400	400	500	500	500	500	500

31 **P20E2** Exh_tDiffMaxHiTOxiCatDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	10000	15000	20000	25000	28800	32000
Delta Temperature (°C)	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	20	20

32 **P20E4** Exh_tDiffMaxHiTPFltDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	10000	15000	20000	25000	28800	32000
Delta Temperature (°C)	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	20	20

33 **P24B 7** -

PM Sensor Temperature (°C)	-30.00	19.98	69.98	119.98	150.00
Heater Resistance (Ohm)	2.93	3.26	3.60	3.93	4.13

34 **P24B 7** -

PM Sensor Temperature (°C)	-30.00	19.98	69.98	119.98	150.00

Heater Resistance (Ohm)	1.09	1.29	1.49	1.69	1.81

35 **P2598, P2599** TrbCh_tiEnaMonDlyBrk_CUR

Ambient Pressure (kPa)	50.00	59.80	59.90	60.00	65.00	70	76	84	96	100
Delay Time (sec)	15.00	15.00	15.00	15.00	15.00	10	10	5	3	0

37 **P0263, P0266, P0269, P0272** FBC_qLimNeg_MAP

ECT (°C) / Inj. Qty (mm^3/rev)	0	4	28	200	202	204	206	208
-40.04	0	0	-24	-24	-24	-24	-24	-24
-15.04	0	0	-24	-24	-24	-24	-24	-24
9.96	0	0	-24	-24	-24	-24	-24	-24
34.96	0	0	-24	-24	-24	-24	-24	-24
59.96	0	0	-24	-24	-24	-24	-24	-24
84.96	0	0	-24	-24	-24	-24	-24	-24
109.96	0	0	-24	-24	-24	-24	-24	-24
134.96	0	0	-24	-24	-24	-24	-24	-24

38 **P0263, P0266, P0269, P0272** FBC_qLimPos_MAP

ECT (°C) / Inj. Qty (mm^3/rev)	0	4	28	200	202	204	206	208
-40.04	0	0	24	24	24	24	24	24
-15.04	0	0	24	24	24	24	24	24
9.96	0	0	24	24	24	24	24	24
34.96	0	0	24	24	24	24	24	24
59.96	0	0	24	24	24	24	24	24
84.96	0	0	24	24	24	24	24	24
109.96	0	0	24	24	24	24	24	24
134.96	0	0	24	24	24	24	24	24

39 **P026D** FMO_qFlSysThresMax_MAP

Injection Qty (mm^3/rev) / Air Mass per Cylinder (g/rev)	0.135	0.15	0.175	0.2	0.225	0.25	0.275	0.3
14	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
16.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
18	0	0	0	0	0	0	0	0
20	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
22	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
24	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
26	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
28	2	2	2	2	2	2	2	2

40 **P026C, P026D** FMO_stOutObsvr_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
4	0	0	0	0	0	0	0	0	0	0
12	1	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1	1
36	1	1	1	1	1	1	1	1	1	1
48	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1
72	1	1	1	1	1	1	1	1	1	1
84	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1

41 **P054F** InjCtl_qDesGearMonMax_MAP

ECT (°C) / Engine Speed (rpm)	0	400	600	825	1050	5000
-20.04	166.6	166.6	166.6	166.6	166.6	166.6
-10.04	123.6	123.6	123.6	123.6	123.6	123.6
-0.04	122	122	122	122	122	122
19.96	100.6	100.6	100.6	100.6	100.6	100.6
39.96	82.4	82.4	82.4	82.4	82.4	82.4
69.96	78	78	78	78	78	78

42 **P054F** InjCtl_qDesNeutrGearMonMax_MAP

ECT (°C) / Engine Speed (rpm)	0	400	600	825	1050	5000
-20.04	117	117	117	117	117	117
-0.04	88	88	88	88	88	88
9.96	70.6	70.6	70.6	70.6	70.6	70.6
19.96	63.8	63.8	63.8	63.8	63.8	63.8
39.96	65.6	65.6	65.6	65.6	65.6	65.6
69.96	61.8	61.8	61.8	61.8	61.8	61.8

43 **P054E** InjCtl_qDesNeutrGearMonMin_MAP

ECT (°C) / Engine Speed (rpm)	0	400	600	825	1050	5000
-20.04	26.6	26.6	26.6	26.6	26.6	26.6
-0.04	17	17	17	17	17	17
9.96	11.2	11.2	11.2	11.2	11.2	11.2
19.96	9	9	9	9	9	9
39.96	9.4	9.4	9.4	9.4	9.4	9.4
69.96	8.2	8.2	8.2	8.2	8.2	8.2

44 **P054E** InjCtl_qDesGearMonMin_MAP

ECT (°C) / Engine Speed (rpm)	0	400	600	825	1050	5000
-20.04	40.4	40.4	40.4	40.4	40.4	40.4
-0.04	26.2	26.2	26.2	26.2	26.2	26.2
9.96	25.6	25.6	25.6	25.6	25.6	25.6
19.96	18.4	18.4	18.4	18.4	18.4	18.4
39.96	12.4	12.4	12.4	12.4	12.4	12.4
69.96	10.8	10.8	10.8	10.8	10.8	10.8

45 **P11A6, P11A9, P2297** LSU_mAirMax_C

Column Number (-)	0	1	2
Air Mass per Cylinder (g/rev)	0.2525	0.275	0.45

46 **P11A6, P11A9, P2297** LSU_mAirMin_C

Column Number (-)	0	1	2
Air Mass per Cylinder (g/rev)	0.25	0.09	0.1

47 **P11A6, P11A9, P2297** LSU_nMax_C

Column Number (-)	0	1	2
Engine Speed (rpm)	2800	2700	4500

48 **P11A6, P11A9, P2297** LSU_qMax_C

Column Number (-)	0	1	2
Injection Quantity (mm^3/rev)	44	36	0.4

49 **P11A6, P11A9, P2297** LSU_qMin_C

Column Number (-)	0	1	2
Injection Quantity (mm^3/rev)	16	8	-1

50 **P11A9, P2297** LSU_rO2NegDvt_C

Column Number (-)	0	1	2
Difference between Calculated and Mesaured O2 (-)	0.07	0.07	0.06

51 **P11A6, P2297** LSU_rO2PosDvt_C

Column Number (-)	0	1	2
Difference between Calculated and Mesaured O2 (-)	0.07	0.07	0.04

52 **P0300, P0301, P0302, P0303, P0304** MisfDet_dnThresIdl_CUR

Injection Quantity (mm^3/rev)	10	18	40	60
Crankshaft Angular Acceleration (s^(-2))	-2.5	-4	-8	-12

53 **P0606** MoFInjQnt_tiZFCETMax_CUR

Rail Pressure (kPa)	30400	70400	80000	90400	120000	130400
Energizing Time (µsec)	500	300	275.2	250	158	50

54 **P0606** MoFInjQnt_tiZFCETMin_CUR

Rail Pressure (kPa)	30400	70400	80000	90400	120000	130400
Energizing Time (µsec)	-500	-300	-274.8	-250	-158	-50

55 **P0606** MoFOvR_tiLimET_CUR

Engine Speed (rpm)	0	2080	2120	4000
Energizing Time (µsec)	6000	6000	200	200

57 **P0299** PCR_pMaxDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1000	1500	1750	2000	2500	3000	4500
0	25	20	20	20	22.5	25	25	45
20	25	20	20	20	25	35	40	45
40	25	25	25	25	25	35	40	45
60	27.5	27.5	30	35	35	35	45	45
80	30	32.5	40	45	45	45	45	45
100	35	35	47.5	50	50	50	55	55
120	45	45	50	55	55	55	55	55
140	50	50	55	55	55	55	55	55

58 **P0234** PCR_pMinDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1200	1500	2000	2500	3000	3500	5500
2	-12.5	-12.5	-12.5	-10	-15	-20	-40	-40
10	-12.5	-12.5	-12.5	-15	-15	-20	-40	-40
20	-15	-15	-15	-15	-15	-20	-40	-40
30	-15	-15	-15	-15	-15	-20	-40	-40
80	-20	-20	-20	-20	-20	-20	-40	-40
100	-20	-20	-25	-25	-25	-25	-40	-40
120	-30	-30	-30	-30	-30	-30	-40	-40
140	-40	-40	-40	-40	-40	-40	-40	-40

59 **P2263** PCR_pOvrBstDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	550	1200	1500	2000	2500	3000	3500	5500
2	-25	-25	-25	-25	-25	-30	-40	-40
10	-25	-25	-25	-25	-25	-30	-40	-40
20	-25	-25	-25	-25	-25	-30	-40	-40
30	-30	-30	-30	-30	-25	-30	-40	-40
80	-30	-30	-30	-30	-30	-30	-40	-40
100	-30	-30	-50	-50	-50	-50	-50	-50
120	-40	-40	-55	-55	-55	-55	-55	-55
140	-55	-55	-55	-55	-55	-55	-55	-55

60 **P2263** PCR_pUndrBstDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	1000	1500	1750	2000	2500	3000	4500
0	40	35	35	35	37.5	40	40	60
20	40	35	35	35	40	50	55	55
40	40	40	40	40	40	50	55	55
60	47.5	47.5	60	65	65	65	70	70
80	50	52.5	65	75	75	75	75	75
100	55	55	70	80	80	80	80	80
120	60	60	75	80	80	80	80	80
140	70	70	80	85	85	85	85	85

61 **P2459** PFlt_mSotThresRgnFreq_CUR

Soot Mass at End of Regen (g)	0	4	8	20	24	26
Soot Mass (g)	0	160	320	800	960	1040

62 **P128E** Rail_pCPCFltMin_CUR

Engine Speed (rpm)	0	200	400	600	700	725	775	850	900	1000	1200	1650	2000	3000	4000	5000
Rail Pressure (kPa)	0	0	0	0	0	0	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

63 **P0087** Rail_pMeUnDvtMax_CUR

Engine Speed (rpm)	0	200	400	600	700	725	775	850	900	1000	1200	1650	2000	3000	4000	5000
Rail Pressure (kPa)	80000	80000	80000	80000	80000	80000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000

64 **P0088** Rail_pMeUnDvtMin_CUR

Engine Speed (rpm)	0	200	400	600	700	725	775	850	900	1000	1200	1650	2000	3000	4000	5000
Rail Pressure (kPa)	-80000	-80000	-80000	-80000	-80000	-80000	-18000	-18000	-18000	-18000	-18000	-18000	-18000	-18000	-18000	-18000

65 **P128E** Rail_pMeUnFltMin_CUR

Engine Speed (rpm)	0	200	400	600	700	725	775	850	900	1000	1200	1650	2000	3000	4000	5000
Rail Pressure (kPa)	0	0	0	0	0	0	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

66 **P0087** Rail_pPCVDvtMax_CUR

Engine Speed (rpm)	0	200	400	600	700	725	775	850	900	1000	1200	1650	2000	3000	4000	5000
Rail Pressure (kPa)	80000	80000	80000	80000	80000	80000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000

67 **P128E** Rail_pPCVFltMin_CUR

Engine Speed (rpm)	0	200	400	600	700	725	775	850	900	1000	1200	1650	2000	3000	4000	5000
Rail Pressure (kPa)	0	0	0	0	0	0	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

68 **P20EE** SCRChk_facEtaEstOfs1_MAP

Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C)	149.96	199.96	229.96	259.96	289.96	319.96	359.96	399.96
11.11	-0.205	-0.205	-0.205	-0.225	-0.262	-0.262	-0.262	-0.262
16.67	-0.205	-0.205	-0.205	-0.225	-0.262	-0.262	-0.262	-0.262
22.22	-0.205	-0.205	-0.205	-0.225	-0.262	-0.262	-0.262	-0.262
27.78	-0.205	-0.205	-0.205	-0.216	-0.257	-0.257	-0.257	-0.257
33.33	-0.205	-0.205	-0.205	-0.207	-0.257	-0.257	-0.257	-0.257
41.67	-0.163	-0.163	-0.163	-0.198	-0.234	-0.243	-0.243	-0.243
50.00	-0.149	-0.149	-0.149	-0.198	-0.225	-0.239	-0.239	-0.239
69.45	-0.149	-0.149	-0.149	-0.198	-0.225	-0.239	-0.239	-0.239

69 **P11CC** SCRChk_facRatHumMinNOxUs_CUR

Relative Humidity (%)	0	30.005	40.002	50	59.998	75	90.002	100
Correction Factor (factor)	1	1	1	1	1	1	1.1	1.2

70 **P11CB, P11CC** SCRChk_idcPOpMinNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	600	800	1000	1320	1400	1600	1800	2000	2200	2600	2800	3000	3200	4000	5000	10000
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
26	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
32	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
38	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
44	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
50	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	0	0	0	0	0	0	0	0	0

71 **P20EE** SCRChk_mEstNH3LdMax_CUR

SCR Temperature (°C)	149.96	199.96	249.96	299.96	349.96	399.96	449.96	499.96
Ammonia Load (g)	1.31	1.51	1.64	1.45	1.05	0.65	0.4	0.23

72 **P20EE** SCRChk_mEstNH3LdMin_CUR

SCR Temperature (°C)	149.96	199.96	249.96	299.96	349.96	399.96	449.96	499.96
Ammonia Load (g)	1.114	1.284	1.394	1.233	0.893	0.553	0.34	0.196

73 **P20EE** SCRChk_mNOxUsMin1_MAP

Exhaust Gas Mass Flow (g/sec) / SCR Temperature (°C)	149.96	199.96	229.96	259.96	289.96	319.96	359.96	599.96
11.11	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
16.67	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
22.22	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
27.78	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
33.33	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
41.67	1.55	1.55	1.55	1.55	1.59	1.64	1.64	1.64
50.00	2.28	2.28	2.28	2.28	2.44	2.6	2.6	2.6
69.45	4.4	4.4	4.4	4.4	4.95	5.5	5.5	5.5

74 **P11CB** SCRChk_rNOxDiffThresBasMaxUs_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	800	1250	1400	1600	2000	2250	2500	3000	3200	4000
10	0.57	0.57	0.57	0.76	1.14	1.40	1.30	1.30	1.30	1.30
14	0.57	0.57	0.57	0.76	1.09	1.40	1.30	1.30	1.30	1.30
20	0.57	0.57	0.57	0.76	0.99	1.30	1.15	1.22	1.22	1.22
26	0.57	0.57	0.57	0.62	0.82	0.90	0.91	1.03	1.03	1.03
32	0.53	0.53	0.53	0.46	0.66	0.80	0.76	0.88	0.88	0.88
38	0.44	0.44	0.44	0.41	0.62	0.75	0.71	0.83	0.83	0.83
44	0.42	0.42	0.42	0.42	0.59	0.65	0.68	0.80	0.80	0.80
50	0.42	0.42	0.42	0.42	0.59	0.62	0.61	0.80	0.80	0.80
60	0.42	0.42	0.42	0.42	0.59	0.62	0.61	0.80	0.80	0.80
80	0.42	0.42	0.42	0.42	0.59	0.62	0.61	0.80	0.80	0.80

75 **P11CC** SCRChk_rNOxDiffThresBasMinUs_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	800	1250	1400	1600	2000	2250	2500	3000	3200	4000
10	-0.60	-0.6	-0.6	-0.5699	-0.58	-0.52	-0.52	-0.52	-0.52	-0.52
14	-0.60	-0.6	-0.6	-0.5699	-0.58	-0.52	-0.52	-0.52	-0.52	-0.52
20	-0.60	-0.6	-0.6	-0.5699	-0.58	-0.52	-0.52	-0.52	-0.52	-0.52

26	-0.61	-0.61	-0.61	-0.62	-0.63	-0.58	-0.58	-0.5601	-0.5601	-0.5601
32	-0.62	-0.62	-0.62	-0.64	-0.65	-0.6	-0.6	-0.58	-0.58	-0.58
38	-0.62	-0.62	-0.62	-0.64	-0.66	-0.62	-0.62	-0.59	-0.59	-0.59
44	-0.63	-0.63	-0.63	-0.64	-0.67	-0.63	-0.63	-0.6	-0.6	-0.6
50	-0.63	-0.63	-0.63	-0.64	-0.67	-0.64	-0.64	-0.6	-0.6	-0.6
60	-0.63	-0.63	-0.63	-0.64	-0.67	-0.64	-0.64	-0.6	-0.6	-0.6
80	-0.63	-0.63	-0.63	-0.64	-0.67	-0.64	-0.64	-0.6	-0.6	-0.6

76 **P11CB, P11CC** SCRChk_stExhTempRlsUsPlaus_CUR

Exhaust Gas Temp @ NOx Sensor (°C)	179.96	199.96
Enable Condition (1 = Enable) (-)	0	1

77 **P20EE** SCRChk_tDeltaTempSCRMax_CUR

Filtered SCR Temp (°C)	179.96	229.96	249.96	279.96	299.96	309.96	319.96	399.96
Delta SCR Temp (°C)	3.06	3.06	3.16	3.96	2.36	1.76	1.46	1.36

78 **P20EE** SCRChk_tDeltaTempSCRMin_CUR

Filtered SCR Temp (°C)	179.96	229.96	249.96	279.96	299.96	309.96	319.96	399.96
Delta SCR Temp (°C)	-3.04	-3.04	-3.24	-3.64	-2.54	-2.24	-2.04	-2.04

79 **P20EE** SCRChk_tiAddDisbl_MAP

Nox Peak Duration (s) / Nox Mass Flow (g/s)	0	0.08	0.1	0.15	0.2	0.3	0.4	1.65
0	0	0	5	5	5	5	5	5
1	0	0	5	5	5	5	5	5
2	0	0	5	5	5	5	5	5
5	0	0	5	10	10	10	10	10
10	0	0	10	20	20	20	20	20
60	0	0	30	60	60	60	60	60
120	60	60	60	60	60	60	60	60
1000	60	60	60	60	60	60	60	60

80 **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

81 **Engine Running** StSys_nStrtCutOut_MAP

BARO Pressure (kPa) / ECT at Start (°C)	-40.04	-20.04	-10.04	-0.04	29.96	38.96	39.96	59.96
57.7	1100	1100	1000	1000	1000	1000	850	850

61.6	1100	1100	1000	1000	1000	1000	850	850
65.8	1100	1100	1000	1000	1000	1000	850	850
70.1	1100	1100	1000	1000	1000	1000	850	850
74.5	1100	1100	1000	1000	1000	1000	850	850
79.5	1100	1100	1000	1000	1000	1000	850	850
83	1100	1100	1000	1000	1000	1000	850	850
101.3	1100	1100	1000	1000	1000	1000	850	850

82 **P01CB, P01CC, P01CD, P01CE, P01CF, P01D0, P01D1, P01D2, P02CD, P02CF, P02D1, P02D3** ZFC_stGearRls_CA

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

83 **P01CB, P01CC, P01CD, P01CE, P01CF, P01D0, P01D1, P01D2, P02CD, P02CF, P02D1, P02D3** ZFC_tiCldCham_CUR

ECT (°C)	-7.04	-5.04	0.96	5.96	13.96	18.96	24.96	29.96	37.96	49.96	59.96	69.96
Time (sec)	7	8	10	11	15	17	20	20	20	20	20	20

end S1-14OBDG04 - Calibration Tables

S2-14OBDG04_PM_Sensor - Calibration Tables

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

1 **P24C7** Exh_tPPDsTempMeaDifNeg_CUR

Exhaust Temperature Average (deg C)	-0.04	49.96	139.96	159.96	179.96	239.96	299.96	399.96
Diagnostic Threshold (deg C)	-30.04	-30.04	-70.04	-75.04	-80.04	-95.04	-110.04	-155.04

2 **P24C7** Exh_tPPDsTempMeaDifPos_CUR

Exhaust Temperature Average (deg C)	-0.04	49.96	139.96	159.96	179.96	239.96	299.96	399.96
Diagnostic Threshold (deg C)	69.96	69.96	109.96	114.96	119.96	134.96	149.96	194.96

end S1-14OBDG04_PM_Sensor - Calibration Tables

Calibration Parameter Definition - Calibration Tables

Status and State Calibration Tables

Table no.	Status or State	Label (Internal Manufacturer Reference)
1	**A/F Sensor Dewpoint Reached, Status of NOx signal of upstream NOx sensor, Upstream NOx sensor dewpoint achieved**	DewDet_wThresLSU0_MAP

ECT at Start (°C) / Modeled Exhaust Wall Temp (°C)	-40.14	-30.04	-20.04	-10.04	-0.04	9.96	19.96	29.96
-40.14	600	600	600	600	600	600	600	600
-30.04	600	600	600	600	600	600	600	600
-20.04	600	600	570	570	570	570	570	570
-10.04	600	600	570	530	530	530	530	530
-0.04	600	600	570	530	370	370	370	370
9.96	600	600	570	530	370	300	300	300
19.96	600	600	570	530	370	300	130	130
29.96	600	600	570	530	370	300	130	130

Table no.	Status or State	Label (Internal Manufacturer Reference)
3	**Status of NOx signal of downstream NOx sensor, Downstream NOx sensor dewpoint achieved, Enabling Downstream NOx sensor heater diagnosis, PM sensor dewpoint achieved**	DewDet_wThresLSU2_MAP

ECT at Start (°C) / Modeled Exhaust Wall Temp (°C)	-40.14	-30.04	-20.04	-10.04	-0.04	9.96	19.96	29.96
-40.14	1460	1460	1460	1460	1460	1460	1460	1460
-30.04	1460	1460	1460	1460	1460	1460	1460	1460

-20.04	1460	1460	1380	1380	1380	1380	1380	1380
-10.04	1460	1460	1380	1300	1300	1300	1300	1300
-0.04	1460	1460	1380	1300	1200	1200	1200	1200
9.96	1460	1460	1380	1300	1200	560	560	560
19.96	1460	1460	1380	1300	1200	560	310	310
29.96	1460	1460	1380	1300	1200	560	310	310

4 **Status thermal regeneration active** PFltLd_dmSotSimRgnBas_CUR

Produced Soot (g)	0	4	6.5	7.5	8	12.5	18	20	22	25	50	100
Soot Mass flow (g/sec)	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.05	0.05	0.05	0.05

5 **Status thermal regeneration active** PFltLd_facO2SimRgn_MAP

Exhaust Mass Flow (g/s) / Lambda (-)	0.9	1	1.05	1.1	1.2	1.4	1.8	3
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.42	0.00	0.00	0.26	0.39	0.52	0.52	0.52	0.52
1.39	0.00	0.00	0.47	0.70	0.94	0.94	0.94	0.94
2.78	0.00	0.00	0.60	0.90	1.20	1.20	1.20	1.20
4.17	0.00	0.00	0.74	1.11	1.48	1.48	1.48	1.48
5.56	0.00	0.00	0.76	1.13	1.51	1.51	1.51	1.51
6.95	0.00	0.00	0.76	1.14	1.53	1.53	1.53	1.53
9.72	0.00	0.00	0.81	1.22	1.62	1.62	1.62	1.62

6 **Status thermal regeneration active** PFltLd_facTempSimRgn_CUR

Particulate Filter Surface Temp (°C)	499.96	524.96	549.96	569.96	579.96	589.96	599.96	624.96	649.96	699.96
Temperature Factor (-)	0	0.1399	0.2247	0.3538	0.5284	0.6799	0.8	0.9	0.9	0.95

7 **Rail Control - PCV Closed Loop Control Only** Rail_dvolMeUnCtlUpLim_CUR

Engine Speed (rpm)	500	750	1400	1700	1950	2804	3054	3304	5000	5001	5002	5003	5004	5005	5006	5007
Rail Volume Flow (mm^3/sec)	20000	20000	20000	21000	22700	30370	32580	33080	33080	33080	33080	33080	33080	33080	33080	33080

Rail Control - Metering Unit + PCV Closed Loop Control
8 Rail_qMeUnCtlType_CUR

Engine Speed (rpm)	850	1025	1200	1300	1500	1700	1900	2100
Injection Qty (mm^3/rev)	9	14	20	24	26	24	21	20

9 **Status of the SCR adaptation plausibility check active** SCRAd_mNH3MinTrg_MAP

SCR Modeled Efficieny (-)/ SCR Temp (°C)	-0.04	99.96	299.86	299.96	399.96	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

10 **Overdosing detected** SCRAd_mNOxOvrMetPh1_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	399.96
Nox Mass (g)	-0.55	-0.45	-0.4	-0.38

11 **Overdosing detected** SCRAd_mNOxOvrMetPh2_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	399.96
Nox Mass (g)	-0.39	-0.34	-0.3	-0.3

12 **Overdosing detected** SCRAd_mNOxOvrMetPh3_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	399.96
Nox Mass (g)	-0.27	-0.23	-0.2	-0.2

13 **Underdosing detected** SCRAd_mNOxUndrMetPh1_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	399.96
Nox Mass (g)	0.45	0.42	0.4	0.4

14 **Underdosing detected** SCRAd_mNOxUndrMetPh2_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	399.96
Nox Mass (g)	0.09	0.08	0.08	0.08

15 **Underdosing detected** SCRAd_mNOxUndrMetPh3_CUR

SCR Avg. Temp (°C)	249.96	299.96	349.96	399.96
Nox Mass (g)	-0.1	-0.08	-0.07	-0.07

16 **State of Reductant injection valve Component Protection** UDC_tUDosVlvCoPrActv_MAP

Vehicle Speed (mph) / Exhaust Gas Temp (°C)	199.96	299.96	399.96	499.96	599.96
0	134.96	134.96	129.96	119.96	119.96
31.25	124.96	124.96	124.96	119.96	119.96

125	119.96	119.96	119.96	119.96	119.96

17 **Release of tank heater circuit** UHC_tiC1On_CUR

Reductant Tank Temp. (°C)	-30.04	-7.04	-6.04	-0.04
Reductant Heater Time (sec)	300	300	0	0

18 **Release of tank heater circuit** UHC_tiDfrstC2_CUR

Reductant Tank Temp. (°C)	-45.04	-30.04	-25.04	-18.04	-9.04	-8.04	-6.04
Reductant Heater Time (sec)	2200	1800	1600	1200	600	300	0

19 **Release of tank heater circuit** UHC_tiDfrstC3_CUR

Reductant Tank Temp. (°C)	-45.04	-30.04	-25.04	-18.04	-9.04	-8.04	-6.04
Reductant Heater Time (sec)	2200	1800	1600	1200	600	300	0

20 **State of the defrosting check of supply module** UHC_tiEngOffC3FrzLim_CUR

Reductant Tank Temp. (°C)	-30.04	-25.04	-20.04	-15.04	-11.04	-5.04
Engine Off Time (sec)	120	120	120	180	550	900

21 **State of the defrosting check of pressure line** UHC_tiEngOffFrzLim_CUR

Reductant Tank Temp. (°C)	-30.04	-25.04	-20.04	-15.04	-11.04	-5.04
Engine Off Time (sec)	120	120	120	180	550	900

22 **Release of tank heater circuit** UHC_tiOnC2_CUR
Release of pressure line heater circuit

Reductant Tank Temp. (°C)	-60.04	-7.04	-6.04	9.96
Reductant Heater Time (sec)	180	180	0	0

23 **Release of tank heater circuit** UHC_tiOnC3_CUR
Release of pressure line heater circuit

Reductant Tank Temp. (°C)	-60.04	-7.04	-6.04	9.96
Reductant Heater Time (sec)	180	180	0	0

24 **Release of tank heater circuit** UHC_tiC1DfrstFirstCyc_MAP

Ambient Air Temp (°C) / Reductant Tank Temp (°C)	-45.04	-30.04	-25.04	-18.04	-9.04	-8.04	-6.04
-45.04	4170	3270	2670	1800	1200	600	10

-25.04	4170	3270	2670	1800	1200	600	10
-18.04	4170	3270	2670	1800	1200	600	10
-9.04	4170	3270	2670	1800	1200	600	10
-8.04	4170	3270	2670	1800	1200	600	10
-5.04	4170	3270	2670	1800	1200	600	10
9.96	4170	3270	2670	1800	1200	600	10
19.96	4170	3270	2670	1800	1200	600	10

14 OBDG04 ECM Inhibit Tables

Active DTC	Inhibited DTCs												
P0016 - Crankshaft to Camshaft Correlation	P0315 - Crankshaft Position System Variation Not Learned												
P0030 - HO2S Heater Control Circuit Bank 1 Sensor 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1						
P0031 - HO2S Heater Control Circuit Low Bank 1 Sensor 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1						
P0032 - HO2S Heater Control Circuit High Bank 1 Sensor 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1						
P0047 - Turbocharger Boost Control Circuit Low Voltage	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1			
P0048 - Turbocharger Boost Control Circuit High Voltage	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1			
P007C - CAC Temperature Sensor Circuit Low Voltage	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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			
	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P168A	P168B					
P007D - CAC Temperature Sensor Circuit High Voltage	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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			
	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P168A	P168B					
P0087 - Fuel Rail/System Pressure - Too Low Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P0088 - Fuel Rail Pressure Too High	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P0091 - Fuel Pressure Regulator 1 Control Circuit Low	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P0092 - Fuel Pressure Regulator 1 Control Circuit High	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P0102 - Mass Air Flow Sensor Circuit Low	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2459 - Diesel Particulate Filter Regeneration Frequency	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance	
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	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	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	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	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance
P0112 - Intake Air Temperature Sensor 1 Circuit Low	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible							
P0113 - Intake Air Temperature Sensor 1 Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible							
P0117 - Engine Coolant Temperature Sensor Circuit Low	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	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	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System
	P0272 - Cly 4 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	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P0506 - Idle Speed Low	P0507 - Idle Speed High	
P0118 - Engine Coolant Temperature Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	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	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System
	P0272 - Cly 4 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	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P0506 - Idle Speed Low	P0507 - Idle Speed High	
P011B - Engine Coolant Temperature/Intake Air Temperature Correlation	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1												
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring Temperature												
P0131 - HO2S Bank 1 Sensor 1 circuit low	P0132 - HO2S Bank 1 Sensor 1 circuit high	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1				
P0132 - HO2S Bank 1 Sensor 1 circuit high	P0131 - HO2S Bank 1 Sensor 1 circuit low	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1				
P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P0171 - System Too Lean Bank 1	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										
P0172 - System Too Rich Bank 1	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										
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					
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					
P0192 - Fuel Rail Pressure Sensor 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	P2002 - Diesel Particulate Filter (DPF) Low Efficiency				
P0193 - Fuel Rail Pressure Sensor 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	P2002 - Diesel Particulate Filter (DPF) Low Efficiency				
P01CB - Cylinder 1 Injection Timing Retarded	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01CC - Cylinder 1 Injection Timing Advanced	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01CD - Cylinder 2 Injection Timing Retarded	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01CE - Cylinder 2 Injection Timing Advanced	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01CF - Cylinder 3 Injection Timing Retarded	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01D0 - Cylinder 3 Injection Timing Advanced	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01D1 - Cylinder 4 Injection Timing Retarded	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P01D2 - Cylinder 4 Injection Timing Advanced	P2002 - Diesel Particulate Filter (DPF) Low Efficiency												
P0201 - Injector 1 Control Circuit	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
P0202 - Injector 2 Control Circuit	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
P0203 - Injector 3 Control Circuit	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
P0204 - Injector 4 Control Circuit	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
P0234 - Turbocharger Engine Overboost	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	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	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2459 - Diesel Particulate Filter Regeneration Frequency	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1
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	P2002 - Diesel Particulate Filter (DPF) Low Efficiency										
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	P2002 - Diesel Particulate Filter (DPF) Low Efficiency										
P0299 - Turbocharger Engine Underboost	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	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	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2459 - Diesel Particulate Filter Regeneration Frequency	P2A00 - O2 Sensor Circuit Range/Performance 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	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive											
P02E9 - Diesel Intake Air Flow Position Sensor Circuit High	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive											
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										
P0300 - Engine Misfire Detected	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P0301 - Cylinder 1 Misfire Detected	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P0302 - Cylinder 2 Misfire Detected	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P0303 - Cylinder 3 Misfire Detected	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P0304 - Cylinder 4 Misfire Detected	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P0335 - Crankshaft Position Sensor Circuit	P0016 - Crankshaft to Camshaft Correlation	P0102 - Mass Air Flow Sensor 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	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High	
P0336 - Crankshaft Position Sensor Performance	P0016 - Crankshaft to Camshaft Correlation	P0102 - Mass Air Flow Sensor 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	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High	
P0340 - Camshaft Position Sensor Circuit	P0016 - Crankshaft to Camshaft Correlation	P0315 - Crankshaft Position System Variation Not Learned												
P0341 - Camshaft Position Sensor Performance	P0016 - Crankshaft to Camshaft Correlation	P0315 - Crankshaft Position System Variation Not Learned												
P0401 - Exhaust Gas Recirculation Flow Insufficient	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	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	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	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	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor	P2459 - Diesel Particulate Filter Regeneration Frequency	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too	P24B4 - Particulate Matter Sensor Heater Control Circuit	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1							
P0402 - Exhaust Gas Recirculation Flow Excessive	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	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	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	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	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2459 - Diesel Particulate Filter Regeneration Frequency	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1							
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance										
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/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													
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												
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance									
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance									
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													
P0641 - 5 Volt Reference 1 Circuit	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	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0299 - Turbocharger Engine Underboost	P0462 - Fuel Level Sensor Circuit Low	
	P0532 - Air Conditioning Refrigerant Pressure Sensor Circuit Low	P0533 - Air Conditioning Refrigerant Pressure Sensor Circuit High	P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage							
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	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
	P0299 - Turbocharger Engine Underboost	P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P2123 - Accelerator Pedal Position Sensor 1 Circuit High	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation										
P0697 - 5 Volt Reference 3 Circuit	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	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	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	
	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive											
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													
P11D3 - Nox Sensor Offset Learning at Min Limit - 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												
P11D4 - Nox Sensor Offset Learning at Max Limit - 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												
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												
P12B0 - Intake Manifold Runner Actuator Feedback Signal Circuit Low	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P12B1 - Intake Manifold Runner Actuator Feedback Signal Circuit High	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
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	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									
P147F - Particulate Matter Sensor Compensation Value Missing/Not Received	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P163C - Glow Plug Control Module Primary Circuit	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1												
P2009 - Intake Manifold Runner Control Circuit Low Bank 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2459 - Diesel Particulate Filter Regeneration Frequency	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1

P2010 - Intake Manifold Runner Control Circuit High Bank 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	P0234 - Turbocharger Engine Overboost	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2459 - Diesel Particulate Filter Regeneration Frequency	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1	
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature											
P2033 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature											
P2048 - Reductant Injector Control Circuit Low Voltage	P1048 - Reductant Injector High Control Circuit Low Voltage														
P2049 - Reductant Injector Control Circuit High Voltage	P1049 - Reductant Injector High Control Circuit High Voltage														
P204B - Reductant Pump Pressure Sensor Performance	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20E8 - Reductant Pressure Too Low													
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	P214F - Reductant Heater 1 Current Too High	P21DD - Reductant Heater 1 Current Too Low													
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												
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												
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												
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												
P20B9 - Reductant Heater 1 Control Circuit	P214F - Reductant Heater 1 Current Too High	P21DD - Reductant Heater 1 Current Too Low													
P20BB - Reductant Heater 1 Control Circuit Low	P214F - Reductant Heater 1 Current Too High	P21DD - Reductant Heater 1 Current Too Low													
P20BC - Reductant Heater 1 Control Circuit High	P214F - Reductant Heater 1 Current Too High	P21DD - Reductant Heater 1 Current Too Low													
P20C0 - Reductant Heater 2 Control Circuit High	P214F - Reductant Heater 1 Current Too High	P21DD - Reductant Heater 1 Current Too Low													
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency													
P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation													
P2123 - Accelerator Pedal Position Sensor 1 Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation													
P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation													
P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation													
P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature														
P2146 - Injector Positive Voltage Control Circuit Group 1	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							
P2149 - Injector Positive Voltage Control Circuit Group 2	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	P2146 - Injector Positive Voltage Control Circuit Group 1						
P2199 - Intake Air Temperature Sensor 1/2 Correlation	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1													
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													
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													
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	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	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	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2459 - Diesel Particulate Filter Regeneration Frequency	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1			
P2229 - Barometric Pressure Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	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	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2459 - Diesel Particulate Filter Regeneration Frequency	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1			
P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1								
P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P0131 - HO2S Bank 1 Sensor 1 circuit low	P0132 - HO2S Bank 1 Sensor 1 circuit high	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1							
P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	P0131 - HO2S Bank 1 Sensor 1 circuit low	P0132 - HO2S Bank 1 Sensor 1 circuit high	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1							
P2263 - Turbo Boost System Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P2459 - Diesel Particulate Filter Regeneration Frequency												
P2295 - Fuel Pressure Regulator 2 Control Circuit Low Voltage	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							
P229F - NOx Sensor Performance Bank 1 Sensor 2	P20A1 - Reductant Purge Valve Performance	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													
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P2428 - Exhaust Gas High Temperature	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance													
P242D - Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P2428 - Exhaust Gas High Temperature	P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance													
P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	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	P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2459 - Diesel Particulate Filter Regeneration Frequency													
P2459 - Diesel Particulate Filter Regeneration Frequency	P2002 - Diesel Particulate Filter (DPF) Low Efficiency														
P245C - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 Low Voltage	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2002 - Diesel Particulate Filter (DPF) Low Efficiency								

P245D - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 High Voltage	P0171 - System Too Lean Bank 1	P0172 - System Too Rich Bank 1	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2002 - Diesel Particulate Filter (DPF) Low Efficiency
P2463 - Diesel Particulate Filter - Soot Accumulation	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency					
P24AF - Particulate Matter Sensor Circuit Range/Performance	P2002 - Diesel Particulate Filter (DPF) Low Efficiency						
P24B3 - Particulate Matter Sensor Heater Control Circuit/Open	P2002 - Diesel Particulate Filter (DPF) Low Efficiency						
P24B4 - Particulate Matter Sensor Heater Control Circuit Range/Performance	P2002 - Diesel Particulate Filter (DPF) Low Efficiency						
P24B6 - Particulate Matter Sensor Heater Control Circuit High	P2002 - Diesel Particulate Filter (DPF) Low Efficiency						
P24B7 - Particulate Matter Sensor Heater Resistance	P2002 - Diesel Particulate Filter (DPF) Low Efficiency						
P24C6 - Particulate Matter Sensor Temperature Circuit	P2002 - Diesel Particulate Filter (DPF) Low Efficiency						
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	P2002 - Diesel Particulate Filter (DPF) Low Efficiency		
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	P2002 - Diesel Particulate Filter (DPF) Low Efficiency		
P2598 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2459 - Diesel Particulate Filter Regeneration Frequency					
P2599 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P2459 - Diesel Particulate Filter Regeneration Frequency			
P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1	P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	P11A9 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	
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					

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)			
P0030 - HO2S Heater Control Circuit Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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				
P0031 - HO2S Heater Control Circuit Low Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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				
P0032 - HO2S Heater Control Circuit High Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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				
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			
P0053 - HO2S Heater Resistance Bank 1 Sensor 1							
P007C - CAC Temperature Sensor Circuit Low Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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/System Pressure - Too Low Bank 1	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)				
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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 Solenoid Supply Voltage 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			
P00CA - Fuel Pressure Regulator Solenoid Supply Voltage 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			

P00EA - Intake Air Temperature (IAT) Sensor 3 Circuit Low Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0103 - Mass Air Flow Sensor Circuit High	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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)	
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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)	
P0112 - Intake Air Temperature Sensor 1 Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)						
P0118 - Engine Coolant Temperature Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)						
P011B - Engine Coolant Temperature/Intake Air Temperature Correlation	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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			
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)					
P0132 - HO2S Bank 1 Sensor 1 circuit high	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)					
P0133 - O2 Sensor Circuit Slow Response Bank 1 Sensor 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)
P0171 - System Too Lean Bank 1	System is not in active regeneration mode						

P0172 - System Too Rich Bank 1	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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
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)						
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)						
P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)
P026A - CAC Effieciency Below Threshold	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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	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	System is not in active regeneration mode						
P0299 - Turbocharger Engine Underboost	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)

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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P02EB - Intake Air Flow Valve Control Motor Current Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P0300 - Engine Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0301 - Cylinder 1 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0302 - Cylinder 2 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0303 - Cylinder 3 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
P0304 - Cylinder 4 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)									
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							
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							
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							
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							
P037A - Glow Plug/Heater Indicator 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						
P037B - Glow Plug/Heater Indicator 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						
P0401 - Exhaust Gas Recirculation Flow Insufficient	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0461 - Fuel Level Sensor Performance	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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								
P0506 - Idle Speed Low	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)								
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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					
P054E - Idle Control System - Fuel Quantity Lower Than Expected	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P054F - Idle Control System - Fuel Quantity Higher Than Expected	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0564 - Cruise Control Multi-Function Input "A" Circuit	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	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	System is not in active regeneration mode					
P0567 - Cruise Control Resume Switch Circuit	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)							
P0627 - Fuel Pump Relay Control Circuit	engine not in afterrun mode (defined as engine speed greater than 0 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					
P0628 - Fuel Pump Relay Control Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 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					
P0629 - Fuel Pump Relay Control Circuit High	battery voltage is above 11 V for at least 3s							
P064C - Glow Plug Control Module Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
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						
P0691 - Fan 1 Control Circuit Low	battery voltage is above 11 V for at least 3s							
P0692 - Fan 1 Control Circuit High	battery voltage is above 11 V for at least 3s							
P069E - Fuel Pump Control Module Requested MIL Illumination	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
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 not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)		
P1046 - Reductant Purge Valve High Control Circuit High Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)				
P10CF - Charge Air Cooler Temperature - Intake Air Temperature (IAT) Sensor 3 Correlation	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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)						
P10D0 - Reductant Injector Temperature - Exhaust Gas Temperature 2 Correlation	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is running which means the engine speed is greater than 600 to 850 rpm									
P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 - O2 Sensor Performance - Signal Low During Moderate Load Bank 1 Sensor 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)
P11D3 - Nox Sensor Offset Learning at Min Limit - Bank 1 Sensor 1	battery voltage is above 11 V for at least 3s										
P11D4 - Nox Sensor Offset Learning at Max Limit - Bank 1 Sensor 1	battery voltage is above 11 V for at least 3s										
P11D7 - Nox Sensor Performance - Sensing Element Status Signal Bank 1 Sensor 2	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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	System is not in active regeneration mode					
P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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									
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							
P12B0 - Intake Manifold Runner Actuator Feedback Signal Circuit Low	Engine not in cranking mode (defined as engine speed greater than 90 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								
P12B1 - Intake Manifold Runner Actuator Feedback Signal Circuit High	Engine not in cranking mode (defined as engine speed greater than 90 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								
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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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								
P144E - Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 2 Low Temperature	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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)				
P144F - Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 2 High Temperature	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P150C - TCM Engine Speed Request Signal Message Counter Incorrect	engine is not in standby state (standby state occurs after ECM initialization or following after-run)									
P155A - Cruise Control Switch State Undetermined	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	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	System is not in active regeneration mode					
P161A - Glow Plug Control Module Not Programed	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P163C - Glow Plug Control Module Primary Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P163D - Glow Plug Control Module Secondary Circuit	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P167C - Glow Plug Control Module Temperature / Intake Air Temperature Sensor 1 Correlation	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s								
P16AD - Glow Plug Control Module Temperature Sensor Circuit 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								
P16AE - Glow Plug Control Module Temperature Sensor Circuit 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								
P2008 - Intake Manifold Runner Control Circuit/Open Bank 1	battery voltage is above 11 V for at least 3s									
P2009 - Intake Manifold Runner Control Circuit Low Bank 1	battery voltage is above 11 V for at least 3s									
P2010 - Intake Manifold Runner Control Circuit High Bank 1	battery voltage is above 11 V for at least 3s									
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 the ambient air temperature is >= -7°C and the reductant tank temperature is >= -7°C	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 parameter definitions for reductant level warning definition)	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)	
P205C - Reductant Tank Temperature Sensor Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 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				
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 the ambient air temperature is >= -7°C and the reductant 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 not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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	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 not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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						
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						
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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)			
P20E4 - Exhaust Gas Temperature Sensor 2/3 Correlation Bank 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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)			
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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 parameter definitions for reductant level warning definition)	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)	
P2199 - Intake Air Temperature Sensor 1/2 Correlation	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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				
P21AA - Reductant Level Sensor 2 Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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	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 not in cranking mode (defined as engine speed greater than 90 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)	

P21AF - Reductant Level Sensor 3 Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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	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 not in cranking mode (defined as engine speed greater than 90 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)	
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 not in cranking mode (defined as engine speed greater than 90 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)	
P2200 - N0x Sensor Circuit Bank 1 Sensor 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)	
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 not in cranking mode (defined as engine speed greater than 90 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)	
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 not in cranking mode (defined as engine speed greater than 90 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)	
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 not in cranking mode (defined as engine speed greater than 90 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)	
P2228 - Barometric Pressure Sensor Circuit Low	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)	
P2237 - O2 Sensor Positive Current Control Circuit/Open Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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					
P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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					
P2251 - O2 Sensor Negative Current Control Circuit/Open Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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					
P2263 - Turbo Boost System 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)	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				

P2294 - Fuel Pressure Regulator 2 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						
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						
P2297 - O2 Sensor Out of Range During Deceleration Bank 1 Sensor 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)		
P229E - NOx Sensor Circuit Bank 1 Sensor 2	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)	
P22FE - NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	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 is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	System is not in active regeneration mode				
P2428 - Exhaust Gas High Temperature	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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					
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 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							
P2463 - Diesel Particulate Filter - Soot Accumulation	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)	engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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 parameter definitions for reductant level warning definition)	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)
P24A5 - EGR Cooler Bypass Control Stuck Bank 1	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)		
P24B3 - Particulate Matter Sensor Heater Control Circuit/Open	battery voltage is above 11 V for at least 3s								
P24B6 - Particulate Matter Sensor Heater Control Circuit High	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 not in cranking mode (defined as engine speed greater than 90 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)			
P2565 - Turbocharger Boost Control Position Sensor Circuit High	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine not in cranking mode (defined as engine speed greater than 90 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)			
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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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)			
P262B - Control Module Power 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							
P263A - MIL 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					
P263B - MIL 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					
P2687 - Fuel Supply Heater Control Circuit/Open	battery voltage is above 11 V for at least 3s								
P2688 - Fuel Supply Heater Control Circuit Low	battery voltage is above 11 V for at least 3s								
P2689 - Fuel Supply Heater Control Circuit High	battery voltage is above 11 V for at least 3s								

P268C - Cylinder 1 Injector Data Incorrect	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)							
P268D - Cylinder 2 Injector Data Incorrect	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)							
P268E - Cylinder 3 Injector Data Incorrect	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)							
P268F - Cylinder 4 Injector Data Incorrect	engine Run Time is greater than 10 seconds (Engine not in cranking mode (defined as engine speed greater than 90 rpm) to indicate the engine is running)							
P2A00 - O2 Sensor Circuit Range/Performance Bank 1 Sensor 1	Engine not in cranking mode (defined as engine speed greater than 90 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					
P2BAA - NOx Exceedence - Low Reagent Consumption	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 not in cranking mode (defined as engine speed greater than 90 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 not in cranking mode (defined as engine speed greater than 90 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					
U0109 - Lost Communication With Fuel Pump Control Module "A"	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					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Performance	P064C	Electronic circuitry determines fault with GP switch	Glow Plug Current and Glow plug is commanded and voltage at glow plug	< = =	6.6 On 0	amps volts	glow plugs are commanded on DTCs P163C, P0671-P0678	=	True Not set		fail conditions exists for 3.5 seconds. monitor runs with 0.5 s rate whenever enable conditions are met.	B
		Checksum error between calculated and stored values are compared	ROM error: Checksums match	=	NO		Module power		On		fail conditions exists for 4.5 s. monitor runs with 1.5 s rate whenever enable conditions are met.	
		Compariarson of read write values	RAM error: Read write values match	=	NO		Module power		On		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	
		Checksum error between calculated and stored values	EEPROM error: Checksums match	=	NO		Module power		On		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Under voltage	<=	Battery voltage at GPCM + 7	volts	Battery voltage at GPCM	>	6	volts	fail conditions exists for 3.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	
		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Over voltage	>=	Battery voltage at GPCM + 18	volts	Battery	<	19.9	volts	fail conditions exists for 3.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	
		Elecrtonic circuitry determines that the reverse polarity protection voltage drop is in range	GPCM reverse polarity switch "high voltage drop" Path 1 [Battery voltage at GPCM - mean glow plug voltage value] Path 2 (Battery voltage at GPCM - mean glow plug voltage value with charge pump off) - (Battery - mean glow plug voltage value with charge pu	> <	2.3 0.300	volts volts	glow plugs are commanded Battery voltage at GPCM GP current GP current P0671,P0672, P0675, P0676 Battery voltage at GPCM stable for 30ms	= > > < = <	On 6 6 60 Not set 2	 volts amps amps volts	Path1: fail conditions exists for 9 seconds. monitor runs with 6 s rate whenever enable conditions are met. Path2: fail conditions exists for 13 seconds. monitor runs with 10 s rate whenever enable conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Internal and external Watchdogs are monitored for interuption Monitor for undefined instruction code interupt Monitor for osolation stop detection	GPCM running reset: number of running resets or undefined instruction code detected or Osolation stop detection	>	9 events in a row		none				fail conditions exists for 5 seconds. monitor runs with 2 s rate whenever enable conditions are met.	
		GMLAN Battery voltage from ECM is compared to GPCM internal measured battery voltage	difference between internal and external value of battery voltage too high 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 10 400	 volts	fail conditions exists for 3.19 seconds. monitor runs with 0.19 s rate whenever enable conditions are met.	
		measure temperature of the SBC	system basic chip (SBC) over temperature: temperature of the high side switch inside the SBC	>	155	deg C	Internal GPCM temperature	<	100	deg C	fail conditions exists for 3.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met.	
		Electronic circuitry detects a failure in the NOx sensor power supply	NOx sensor power supply fault: 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)	> > > = =	25 640 60 (by hardware protection (time varies with temperature)) 0 ± 3	amps msec amps volts volts	Battery voltage at the GPCM Battery voltage at the GPCM	> =	6 8 to 14	volts volts	fail conditions exists for 9 seconds. monitor runs with 6 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.
		Checksum error between calculated and stored values	DEF heater current not calibrated.: Checksums match	=	No		Ignition on				fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	
		DEF heater power switch is commanded on. Output voltage feedback signal is missing.	DEF output voltage feedback signal	<	2.5	volts	DEF heater is commanded Battery voltage at GPCM over temperature condition	= > =	on 7.0 false	 volts 	fail conditions exists for 6.3 seconds. monitor runs with 3.3 s rate whenever enable conditions are met.	
Glow Plug 1 through 4 Circuit Fault	P0671-P0674	glow plug open: electronic circuitry determines a fault exists on GP circuit	Glow Plug Current and voltage at glow plug pin	< >	4.00 and 6.0	amps volt	Ignition - glow plugs are commanded on P163D,P163C Supply voltage	= > >	On 5 not set 6	 secs volts	fail conditions exists for 1.13 seconds. monitor runs with 0.13 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.
		glow plug short: electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Current Path 2: Hardware over current	> >	60 80	amps amps	Ignition glow plug command over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= = = = <	on on false false 6.0	 volts	Path1: fail conditions exists for 1.13 seconds. monitor runs with 0.13 s rate whenever enable conditions are met. Path2: fail conditions exists for 1.26 seconds. monitor runs with 0.26 s rate whenever enable conditions are met.	
		glow plug high resistance: electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance AND Glow Plug Current	> >=	1.83 4.00	ohm amps	Ignition on Battery voltage at GPCM glow plugs are commanded on over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= > = = <	on 7.0 on false false 7.0	 volts volts	fail conditions exists for 1.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Glow plug low resistance: electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Resistance	<	250	mOhm	glow plugs are commanded on	=	on		fail conditions exists for 1.16 seconds. monitor runs with 0.16 s rate whenever enable conditions are met.	
							over temperature condition	=	false			
							over voltage condition-	=	false			
							abs[Battery supply at GPCM - IGN voltage at GPCM]	>	7.0	volts		
							glow plugs "on" duration	>	glow plugs "on" for more then500 ms			
			Path 2: Glow Plug Resistance	<	400	mOhm	glow plugs are commanded on	=	on			
							over temperature condition	=	false			
							over voltage condition-	=	false			
							abs[Battery supply at GPCM - IGN voltage at GPCM]	>	7.0	volts		
							glow plugs "on" duration	>	glow plugs "on" for more then 20 sec			
Lost Communication With Glow Plug Control Module	U0106	GMLAN Communication ECM -> GPCM: ECM monitors serial data from GPCM for U0106. Error Message indicating GPCM is not receiving major GMLAN signals.	Timeout of message $C9	>	0.100	sec	Ignition 1	>	3.9	volts	fail conditions exists for 11 seconds. monitor runs with 10 s rate whenever enable conditions are met.	B
			or				battery voltage at GPCM	>	7.0			
			Timeout of message $4C1	>	0.200	sec						
			or									
			Timeout of message $4F1	>	0.300	sec						
Glow Plug Control Module Not Programed	P161A	ECM monitors serial data from GPCM for P161A. GPCM is configured as service part by calibration parameter	Glow Plug Control Module determines settings of configuration parameter located in calibration data set				IGNITION	=	ON		fail conditions exists for 3.2 seconds. monitor runs with 0.2 s rate whenever enable conditions are met.	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Module Primary Circuit	P163C	Electronic GPCM circuitry determines the voltage supply to GPCM is out of range	PATH 1: voltage supply to GPCM or PATH 2: (IGN - voltage supply to GPCM) or PATH 3: (ECM reported voltage via CAN - voltage supply to GPCM)	< > >	6.0 +/-5 +/-3	volt volt volt	GPCM Ignition voltage or GPCM voltage supply GPCM Ignition voltage or GPCM supply voltage Engine speed	> < > < > >	9.0 16 6.0 4.0 6 10< rpm >400	volt volt volt volt volt rpm	fail conditions exists for 4 seconds. monitor runs with 1 s rate whenever enable conditions are met.	B
Glow Plug Module Secondary Circuit	P163D	Electronic GPCM circuitry determines serveral signal voltage levels to GPCM are out of range	Path 1: Key state (Ign 1) or Path 2: Electronic circuitry determines voltage at glow plug pin or Path 3: [GPCM ground - GP ground]	= > >	OFF 6.0 1.5	volt volts	Path 1 glow plug activation request from ECM or Path 2 GP commanded or Path 3 GP commanded DTCs not set IAH dutycycle	= = = =	ON or Off or ON P0671,P0675 0 or 100	%	fail conditions exists for 4 seconds. monitor runs with 1 s rate whenever enable conditions are met.	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	reductant heater current and voltage at heater pin	< >	0.2 and 3.0	amp volt	DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage	= < >	P20BB ON 123 7.0	°C volt	fail conditions exists for 3.94 seconds. monitor runs with 3.44 s rate whenever enable conditions are met.	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant 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: Reductant Heater Plug Current	>	21	amp	reductan heater commanded:	=	ON	°C	fail conditions exists for 1.5 seconds. monitor runs with 1 s rate whenever enable conditions are met.	A
							GPCM temperature	<	123	volt		
							GPCM supply voltage KL30	>	7.0	volt		
			or		or		or	or	or	or		
			Path 2: load at output (detected by hardware)	<	0.047	ohm	reductan heater commanded:	=	ON			
							GPCM temperature	<	123	°C		
			Path 3: hardware over current	>	27	amp	GPCM supply voltage KL30	>	7.0	volt		
			Path 4: hardware over temperature condition	>	175	°C						
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	hardware (power stage) determines voltage at reductant heater output pin	>	V_{batt} - 0.8	volt	reductan heater commanded:	=	OFF		fail conditions exists for 2.5 seconds. monitor runs with 2 s rate whenever enable conditions are met.	A
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	reductant heater current	<	0.2	amp	DTCs not set:		P20BF		fail conditions exists for 3.94 seconds. monitor runs with 3.44 s rate whenever enable conditions are met.	A
			and				reductan heater commanded:	=	ON			
			voltage at heater pin	>	3.0	volt	GPCM temperature	<	123	°C		
							GPCM battery supply voltage	>	7.0	volt		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
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	>	21	amp	reductan heater commanded:	=	ON	°C	fail conditions exists for 1.5 seconds. monitor runs with 1 s rate whenever enable conditions are met.	A
							GPCM temperature	<	123	volt		
							GPCM supply voltage KL30	>	7.0	volt		
			or		or		or	or	or	or		
			Path 2: load at output (detected by hardware)	<	0.047	ohm	reductan heater commanded:	=	ON			
							GPCM temperature	<	123	°C		
			Path 3: hardware over current	>	27	amp	GPCM supply voltage KL30	>	7.0	volt		
			Path 4: hardware over temperature condition	>	175	°C						
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	hardware (power stage) determines voltage at reductant heater output pin	>	V_{batt} - 0.8	volts	reductan heater commanded:	=	OFF		fail conditions exists for 2.5 seconds. monitor runs with 2 s rate whenever enable conditions are met.	A
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	reductant heater current	<	0.2	amp	DTCs not set:		P20C3		fail conditions exists for 3.94 seconds. monitor runs with 3.44 s rate whenever enable conditions are met.	A
			and		and		reductan heater commanded:	=	ON			
			voltage at heater pin	>	3.0	volt	GPCM temperature	<	123	°C		
							GPCM battery supply voltage	>	7.0	volt		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Heater	P20C3	ECM monitors serial data	Path 1: Reductant Heater Plug Current	>	21	amp	reductan heater commanded:	=	ON	°C	fail	A
3 Control Circuit		from GPCM for P20C3					GPCM temperature	<	123	volt	conditions	
Low voltage		Error Message indicating					GPCM supply voltage KL30	>	7.0	volt	exists for 1.5	
		GPCM detects reductant									seconds.	
		heater output shorted to									monitor runs	
		ground or an overload	or		or		or	or	or	or	with 1 s rate	
		condition									whenever	
											enable	
											conditions	
			Path 2: load at output (detected by	<	0.047	ohm	reductan heater commanded:	=	ON		are met.	
			hardware)				GPCM temperature	<	123	°C		
			Path 3: hardware over current	>	27	amp	GPCM supply voltage KL30	>	7.0	volt		
			Path 4: hardware over temperature	>	175	°C						
			condition									
Reductant Heater	P20C4	ECM monitors serial data	hardware (power stage) determines	>	V_{batt} - 0.8	volts	reductan heater commanded:	=	OFF		fail	A
3 Control Circuit		from GPCM for P20C4	voltage at reductant heater output pin								conditions	
High voltage		Error Message indicating									exists for 2.5	
		GPCM detects reductant									seconds.	
		heater to be shorted to									monitor runs	
		battery									with 2 s rate	
											whenever	
											enable	
											conditions	
											are met.	
Nox Sensor	P220A	ECM monitors serial data	PATH 1:GPCM Electronic circuitry				status DC/DC booster	=	OFF,		fail	B
Supply voltage		from GPCM for P220A	determines voltage at DC/DC booster						power up		conditions	
Circuit Bank 1		Error Message indicating	output pin	>	5.0	volt			procedure has		exists for 5.5	
Sensor 1		GPCM detects DC/DC							started after		seconds.	
		booster output shorted to							reset		monitor runs	
		ground or shorted to battery	or				or				with 5 s rate	
											whenever	
							status DC/DC booster	=	ON		enable	
			PATH 2: DC/DC booster output current	>	5.0	amp					conditions	
			duration	>	0.010	sec					are met.	
							or					
			or									
			PATH 3: DC/DC booster output current	>	37.5	amp	status Dc/DC booster	=	ON			
			duration	>	0.000020	sec						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Nox Sensor 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 5.0 0.010 37.5 0.000020	volt amp sec amp sec	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		fail conditions exists for 5.5 seconds. monitor runs with 5 s rate whenever enable conditions are met.	B
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 PATH 2: GPCM temperature sensor voltage	< <	0.210 0.615	volts volts	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) or Engine Coolant Temperature (GMLAN) and Intake Air Temperature (GMLAN) (Engine Off Timer (GMLAN) or Intake Air Temperature (GMLAN)) and (Engine Coolant Temperature (GMLAN) or	>= >= > > < < <= <=	28800 -7 70 -10 28800 -7 60 -10	sec °C °C °C sec °C °C °C	fail conditions exists for 1.81 seconds. monitor runs with 1.31 s rate whenever enable conditions are met.	B
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	volts	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) or Engine Coolant Temperature (GMLAN) and Intake Air Temperature (GMLAN)	>= >= > >	28800 -7 70 -10	sec °C °C °C	fail conditions exists for 1.81 seconds. monitor runs with 1.31 s rate whenever enable conditions are met.	B

14 OBDG04 Glow Plug Summary Tables

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Glow Plug Control Module Temperature-Engine Intake Air Temperature Not Plausible	P16A8	ECM monitors serial data from GPCM for P16A8 Error Message indicating GPCM detects GPCM temperature and engine intake air temperature (GMLAN) are not plausible	Tenperature difference between internal temperature of GPCM and engine intake air temperature (GMLAN)	>	absolute 20	°C	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and	>= >	28800 -7	sec °C	fail conditions exists for 2.5 seconds. monitor runs with 2 s rate whenever enable conditions are met.	B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode 2. Shutter Control 3. Ignition Run/Crank Voltage	1. Run/Crank 2. Enabled 3. 11V < voltage < 32V	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 120 seconds)	DTC Type B 2 trips
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm	Run or Crank enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR Ign1 Accessory mode	Run or Crank enabled	Runs once at power up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR Ign1 Accessory mode	Run or Crank enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR Ign1 Accessory mode	Run or Crank enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test	P0606	This DTC indicates the ECU has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. Register contents - All I/O configuration register faults - 2. - Processor clock fault - a. EE latch flag set in EEPROM OR	1. <> correct value. 2. a. == 0x5A5A	1. Ignition OR 2. Ign1 Accessory mode 3. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl	1. Run or Crank 2. enabled 3. TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
3. External watchdog test			b. RAM latch flag. 3. - External Watchdog Fault - Software control of fuel pump driver	b. == 0x5A 3. = Control Lost	4 . For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 5. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 6. For External Watchdog Fault: •Control Module ROM(P0601) 7. For External Watchdog Fault: •Control Module RAM(P0604)	4. TRUE 5. TRUE 6. not active 7. not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR Ign1 Accessory mode	Run or Crank enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	1. Run/Crank 2. 11V<voltage<32V 3. not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
Lost Communication With "Actuator"	U0284	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	1. Run/Crank 2. 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips